Virtual Integration Platform
(VIP)
Installation guide and user manual
For Windows

Version 1.2.5

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Part One: Installation and setup guidance

1 Overview

The Virtual Integration Platform (VIP) provides an integrating environment through the provision of data and task level management and co-ordination to enable different Computer Aided Design and Engineering (CAD/CAE) tools to be brought together and operate in a unified and holistic manner.

Its main features include:

OS Independent

- Compatible with a variety of operating systems and platforms, such as MS Windows, Linux, Mac, and UNIX.
- Delivers flexible protocol and communication mechanisms that enable CAD/CAE tools to communicate regardless of the operating system or programming language.

Distributed tool integration

- Disparate tools can be readily integrated through their inputs and outputs.
- Distributed tools can be integrated to the same workflow.

Global optimisation

- Multi-disciplinary aspects of the design can be optimised.
- Solutions can be optimised for multiple criteria and objectives.

Support for multiple user types

- Project manager: Create projects, allocate users and tools, and monitor project progress.
- Specialist user: Configure and perform tasks, and monitor project progress.

Project and process management

- Supports multiple projects and processes.
- Provides real time project status monitoring.

Version management

- Different versions of inputs and output results can be readily managed.
- Different version results can be searched and explored.
- Increased work traceability through backtracking related versions of data and results.

Collaborative environment

- Users can effectively collaborate within the same project regardless of geographical location.
- Changes are propagated too, and seen by all other users working on the same project.
- Data consistency is ensured and single source data maintained.

Multiple results visualisation

- Visual representations of multiple results can be viewed and compared simultaneously.

Data management

- Central index system for distributed data management providing data consistency, reduced database size, and reduced network traffic volume.

2 System requirements

The VIP client could be installed on the following common operating systems: Window, Mac, and Linux. The system requirements for running Skype on different operating systems are described below.

Windows	
Version	Windows XP Windows Vista Windows 7 (32-bit and 64-bit versions supported)
Processor	At least 1GHz
RAM	At least 256 MB
Additional software	The latest version of Java

Mac	
Version	Mac OS X v10.5 “Leopard” Mac OS X v10.6 “Snow Leopard” Mac OS X v10.7 "Lion" (32-bit and 64-bit versions supported)
Processor	1GHz Intel processor (Core 2 duo)
RAM	1GB

Linux	
Version	Ubuntu 8.10+ 32-bit Ubuntu 8.10+ 64-bit Debian Lenny Fedora 10+ OpenSUSE 11+ Dynamic Static
Processor	At least 1GHz
RAM	At least 256 MB

3 Getting started

The VIP has client-server type architecture that enables a distributed working environment, within which multiple users could collaborate with each other by working on a same project. The VIP is composed of four modules:

1. **VIP Client**: The Client, connected to the Database Server, is the main interface used for creating projects and processes, integrating and running tools/software.
2. **Database Server**: The Database Server manages the project related data. The management of all project related data is facilitated through a dbXML database, which stores user account information, project, design and risk data, and Risk Control Options).
3. **SFTP server:** The SFTP server is needed, if users need to transfer files between computers by uploading and downloading files to/from the SFTP server.

4. **Optimisation API**, forms the bridge between the VIP and optimisation tool while carrying out optimisation.

   Optimisation API is only needed when there is external optimisation tool is used in a project.

To ensure that the VIP could be launched correctly, check each sub section in the remaining of this section.

Before log in the VIP, the Database server (see Section 3.3) and SFTP server (see Section 3.4) need to be set up.

3.1 Download the VIP and related software

The following are required for the VIP installation, and could be downloaded from the EuroVIP SharePoint:
https://moss.strath.ac.uk/dmem/eurovip/Platform%20Download/Forms/AllItems.aspx

1. VIP client: VIP-1.2.5.*.exe executable (see Section 3.5 for installation).
2. Database server: dbXML-2.0.zip (see Section 3.3 for setup).
3. FTP server: msftpsrvr.exe (see Section 3.4 for setup).

3.2 Install Java Runtime Environment

For the VIP to run properly, ensure that the latest version (should be at least version 1.6.0) of the Java Runtime Environment (JRE) has been installed on your system.

To download and install the latest JRE, use the following URL:

http://java.com/en/download/index.jsp

After the JRE has been installed, *.jar files should be associated with javaw.exe in your operating system, and it will use javaw.exe to open the *.jar file by default.

To check whether the system has established the link in Windows XP:

1. In the **Windows Explorer**, click **Folder Options…** on the **Tools** menu.
2. In the **Folder Options** window, select tab **File Types** (Figure 3-1).
3. Select JAR from the registered type list.
4. In the **Details for 'JAR' extension** field, make sure it has the correct logo and opens with "Java(TM) Platform SE binary" (see Figure 3-1).

   *If the jar file does not open with JSE binary, click **Change**, and select javaw.exe from the bin folder where the JSE was installed on the computer.*

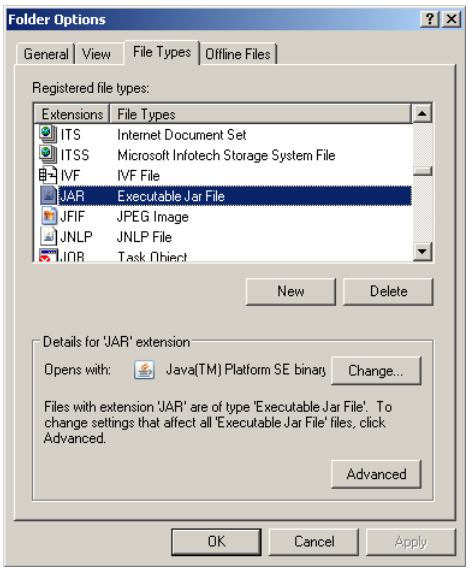


Figure 3-1 File types associations

To check whether the system has established the link in Windows Vista and Windows 7:

1. From the **Control Panel**, choose, **Programs**, and click **Default Programs**, then choose **Associate a file type or protocol with a program**.
2. In the **Set Associations** window, find .jar from the Name list. Make sure it has the correct logo and opens with "Java(TM) Platform SE binary" in the **Current Default** list, (see **Figure 3-2**).

   *If the jar file does not open with JSE binary, click **Change program…**, and select javaw.exe from the bin folder where the JSE was installed on the computer.*

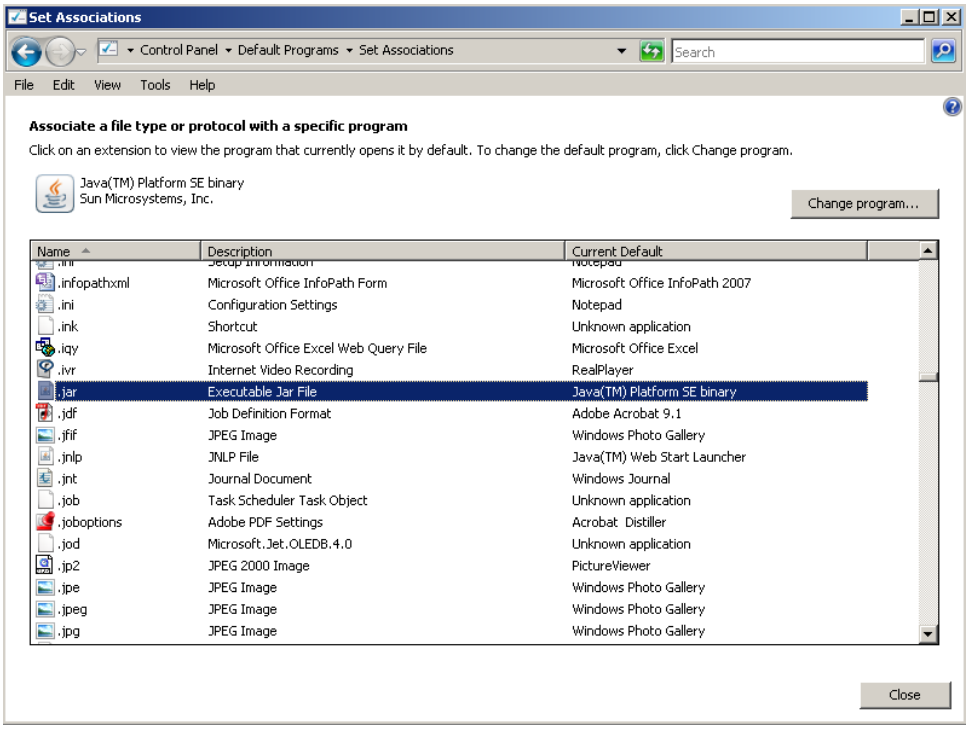


Figure 3-2 File types associations in Vista

3.3 Database server setup

All projects, networks, metadata of the files and parameters, transforms, and parameter values are stored in the Database server. It is necessary to have dbXML database installed and configured to enable the VIP to work properly.

3.3.1 Database server installation and starting up

After downloading the Database (DB) server, the zip file "**dbXML-2.0.zip**", it can be extracted to any location on your local hard disk. For instance, C:\Program Files. Once extracted, you will find dbXML-2.0 folder in your explorer.

1. Configure the location of the DB server:

   a. Right click on file "**startup.bat**" in the dbXML-2.0 folder. On selecting the **Edit** option, the "**startup.bat**" file opens in a notepad application for editing.

   b. Type in the first line the following: set DBXML_HOME=C:\Program Files\dbXML-2.0, to make sure that the DBXML_HOME variable points to the correct folder on your computer.

   ⚠ *Depending on the location you extract the dbXML file, the DBXML_HOME variable can be different.*

   c. Save and close the "**startup.bat**" file.

2. Start the DB server:

   a. Double click the batch file "**startup.bat**" in the directory where the DB was installed, A command prompt window as shown in Figure 3-3 will be displayed. To keep the DB server running, this command prompt window should not be closed.

   ℹ *Alternatively, the DB can be run from a command window. In the command window - change directory to C:\Program Files\dbXML-2.0 and type "**startup.bat**".*

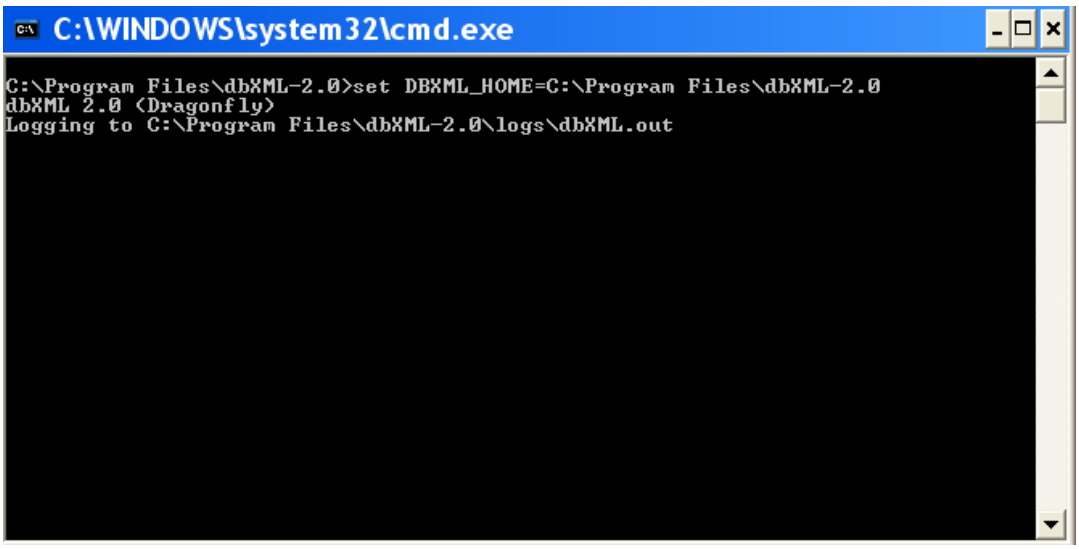


Figure 3-3 Start Database Server

⚠ *If Figure 3-3 does not display, or closes immediately after running the batch file, please check that the configuration in Step 1 is set correctly.*

⚠ *Before launching the VIP, ensure to start the database server.*

3.3.2 Database server configuration

If the database has not been configured, there will be prompt to ask you to configure it the first time when a VIP client connects to the database server. To configure the database server for the VIP:

1. Click **Yes**, when the VIP prompt for server configuration, a set up window as shown in Figure 3-4 will be displayed.

2. Configure the **Database IP Address** to initially connect to the database. The IP address should be the IP address of the computer where the Database server runs.

   To retrieve the IP address of the Database server, from the computer where the database server is running, run the command prompt by clicking on Start/Accessories/ Command Prompt, then type ipconfig and press Enter.

3. Configure the **Database IP Port**. By default, set it as 7280. These values should not be changed.

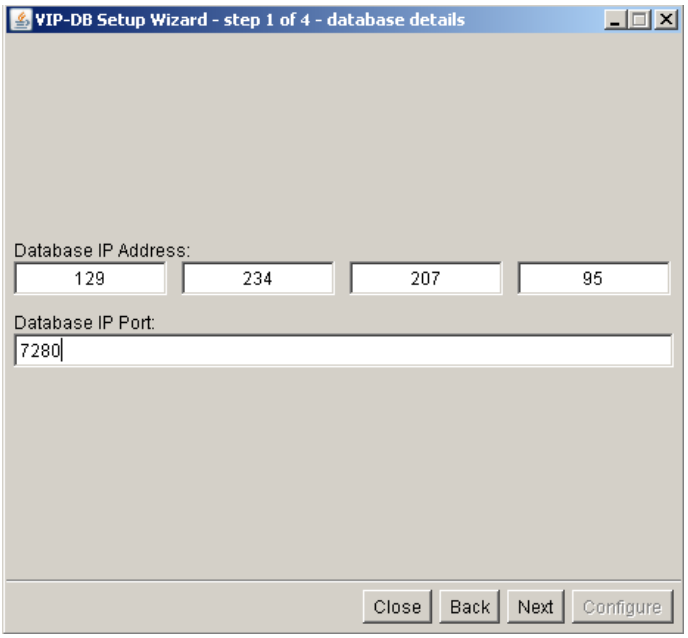


Figure 3-4 Default account to connect to the database

4. Click the **Next** button. An **Admin Account Creation Wizard** window as shown in Figure 3-5 will be displayed.

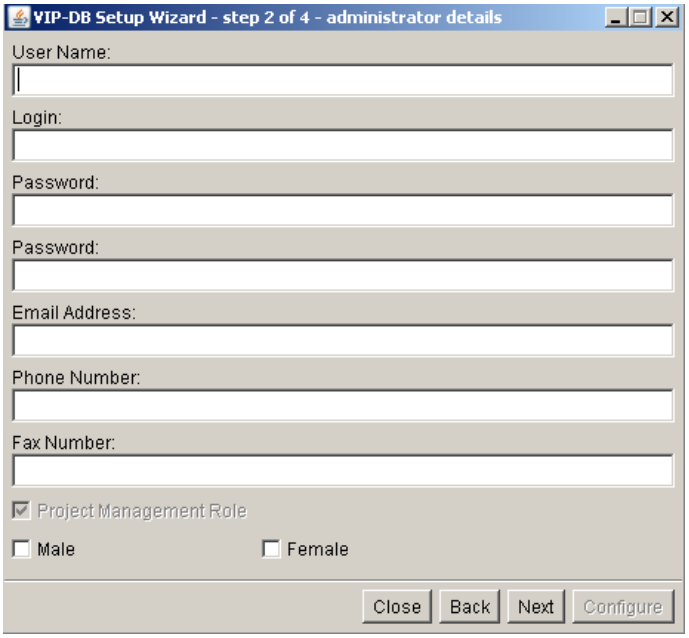


Figure 3-5 Administrator details for user account creation

5. Input administrator details in the fields provided to create a user account and click **Next** button.

   ⚠ *Please note that the VIP requires the **Login** and the **Password** information whenever the user tries to log in.*

   ⚠ *By default **Project Management Role** will be assigned to the user, which permits the user to access existing projects but does not permit to create new ones.*

6. In the windows of Figure 3-6, input organisation details (which is optional) in the fields provided and click **Next** button.

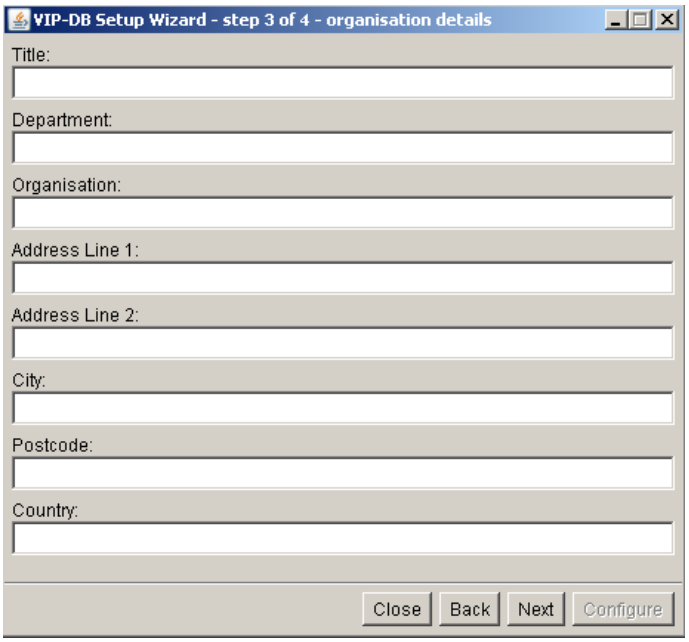


Figure 3-6 Organisation details for user account creation

7. A configuration window as shown in Figure 3-7 will be displayed. Click **Configure** button to create a set up for the user to logon to the platform.

   ⚠ *The configuration window displays (see Figure 3-8):*

(i). *Configuration Progress, which includes: initially connecting to DB via default user; creating admin user; deleting the default user, creating user, project, template and network template collections within the DB and granting system permissions for project role to the user.*

(ii). *Configuration Problems, if there are any, encountered during the configuration process.*

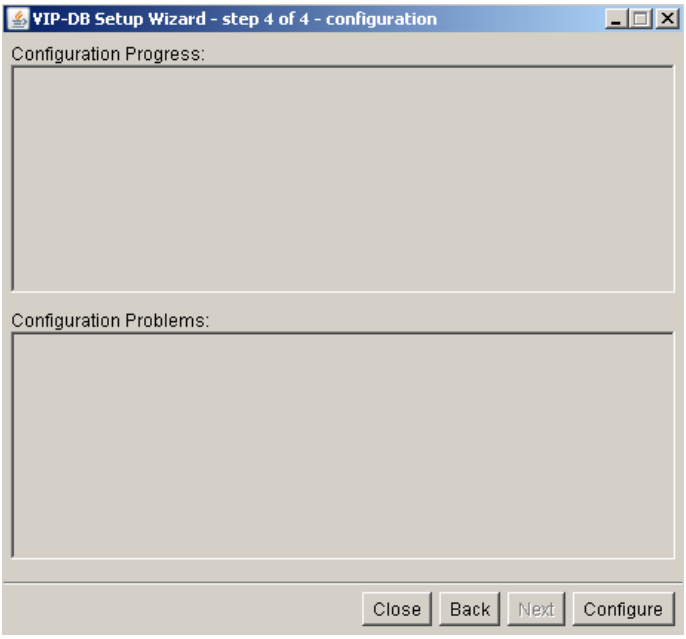


Figure 3-7 Configuration window

2. Click **Close** button upon completion of the configuration. This saves the configuration details and closes the **Admin Account Creation Wizard** window.

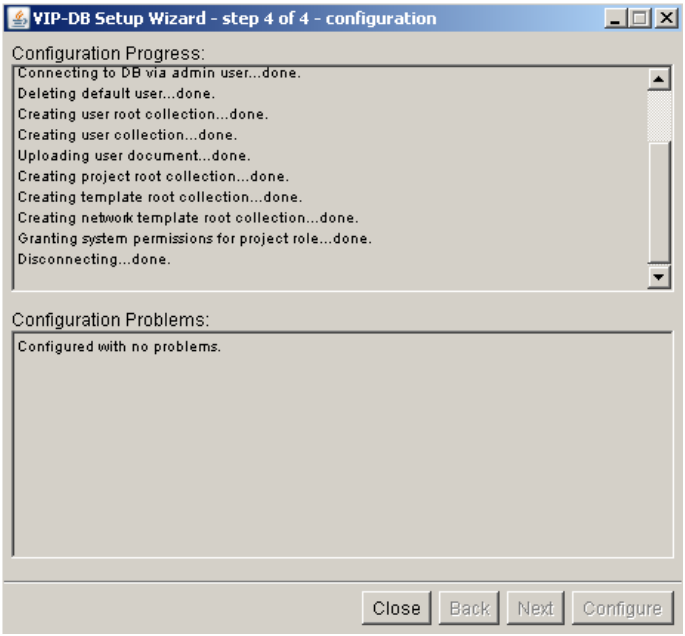


Figure 3-8 Configuring the database

3.4 SFTP server installation

While the DB server stores all projects related data including references to files, the SFTP server manages and saves the files themselves. It is necessary to start and configure an SFTP server if “file” data types are to be used in projects.

SFTP server file can be downloaded from the link below: http://www.coreftp.com/server/download/msftpsrvr.exe

To start the SFTP server, double click the file "**msftpsrvr.exe**", a window as shown in Figure 3-9 will be displayed. To start the server:

1. Configure the **User** and **Password** for the SFTP server.

   *Please note that the **User** and **Password** for the SFTP server application should both remain as the same as that configured in "FTP configuration" within the VIP (See Section 3.7).*

2. Configure the SFTP server **Port**. By default, set it as 22. This value should not be changed.

3. Configure the **Root path** for the SFTP server. It is the path that provides access to VIP users for uploading and downloading files. For example, it can be set as "C:\VIP" if a folder named "VIP" has been created under C:

   Make sure that the "Root path" and the associated folder on the SFTP server are consistent.

4. Click the **Start** button to run the SFTP server.

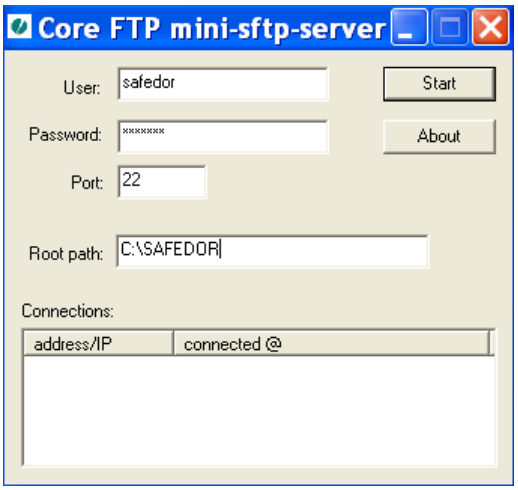


Figure 3-9 Start SFTP server

3.5 VIP installation and un-installation

When a new user is logging into the platform for the first time, it is required to do some basic set up at the Client side.

3.5.1 Installation

1. Double click **VIP_distrib.exe**, an installer window pops up as shown in Figure 3-10.

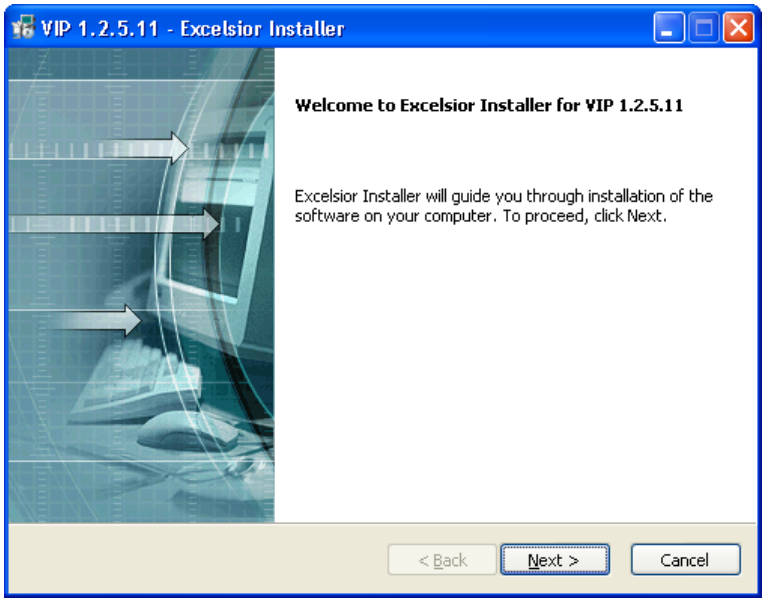

VIP 1.2.5.11 - Excelsior Installer
Welcome to Excelsior Installer for VIP 1.2.5.11
Excelsior Installer will guide you through installation of the software on your computer. To proceed, click Next.
< Back
Next >
Cancel

Figure 3-10 VIP installation 1

2. Click **Next** to continue. A window with options of type of installation shows as shown in Figure 3-11.

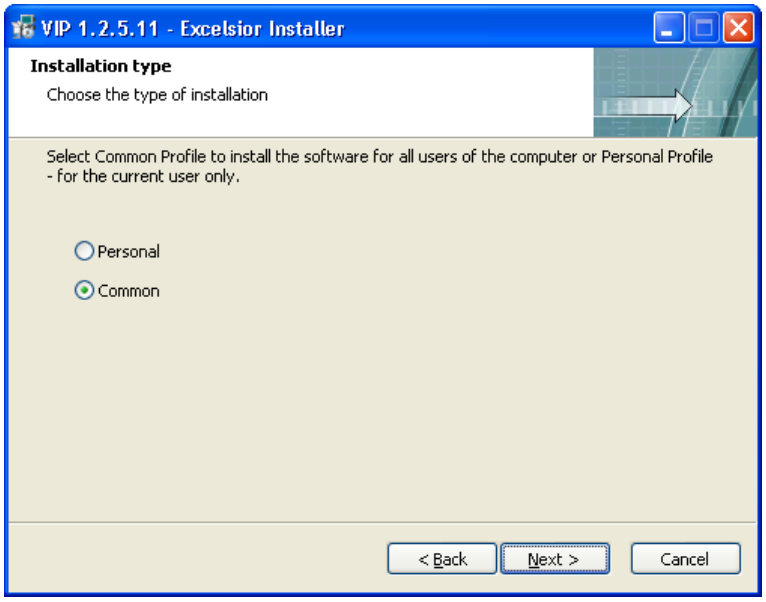

VIP 1.2.5.11 - Excelsior Installer
Installation type
Choose the type of installation
Select Common Profile to install the software for all users of the computer or Personal Profile - for the current user only.
Personal
Common
< Back
Next >
Cancel

Figure 3-11 VIP installation 2

3. Click **Next** to continue. A window where you can change installation folder shows as shown in Figure 3-12.

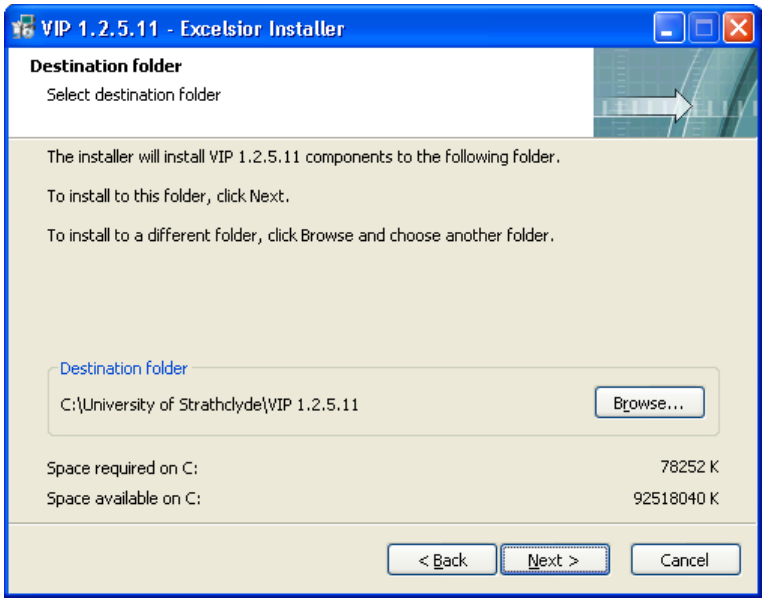

VIP 1.2.5.11 - Excelsior Installer
Destination folder
Select destination folder
The installer will install VIP 1.2.5.11 components to the following folder.
To install to this folder, click Next.
To install to a different folder, click Browse and choose another folder.
Destination folder
C:\University of Strathclyde\VIP 1.2.5.11
Browse...
Space required on C:
78252 K
Space available on C:
92518040 K
< Back
Next >
Cancel

Figure 3-12 VIP installation 3

4. Click **Next** to continue. A window where you can change program folder shows as shown in Figure 3-13.

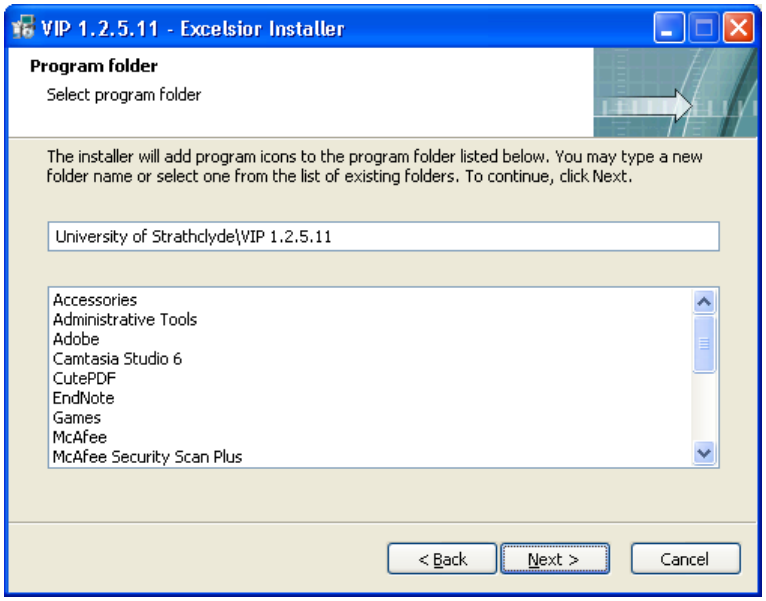

VIP 1.2.5.11 - Excelsior Installer
Program folder
Select program folder
The installer will add program icons to the program folder listed below. You may type a new folder name or select one from the list of existing folders. To continue, click Next.
University of Strathclyde\VIP 1.2.5.11
Accessories
Administrative Tools
Adobe
Camtasia Studio 6
CutePDF
EndNote
Games
McAfee
McAfee Security Scan Plus
< Back
Next >
Cancel

Figure 3-13 VIP installation 4

5. Click **Next** to continue. A window where you can view the current setting of the installation shows as shown in Figure 3-14.

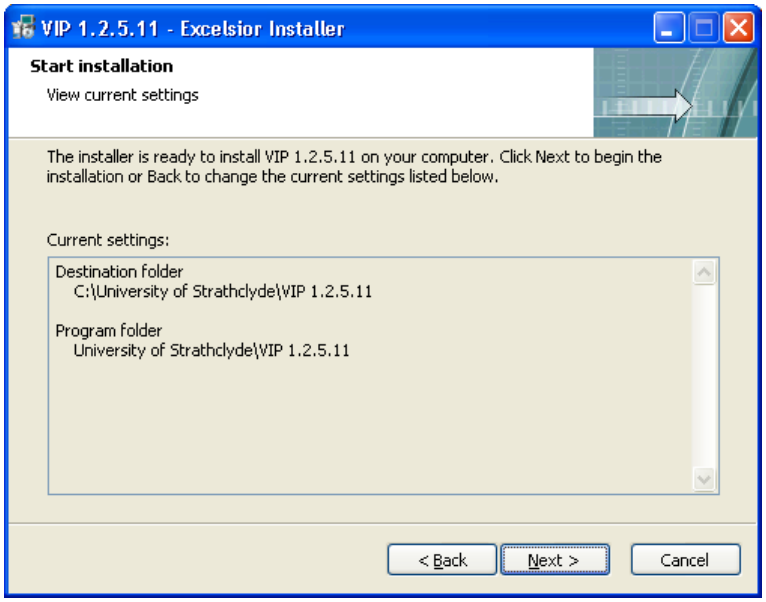

VIP 1.2.5.11 - Excelsior Installer
Start installation
View current settings
The installer is ready to install VIP 1.2.5.11 on your computer. Click Next to begin the installation or Back to change the current settings listed below.
Current settings:
Destination folder
C:\University of Strathclyde\VIP 1.2.5.11
Program folder
University of Strathclyde\VIP 1.2.5.11
< Back
Next >
Cancel

Figure 3-14 VIP installation 5

6. Click **Next** to continue. The progress window as shown in Figure 3-15 shows the installation progress. At the end of the installation, a window as shown in Figure 3-16 shows.

7. Click **Finish** to complete the installation.

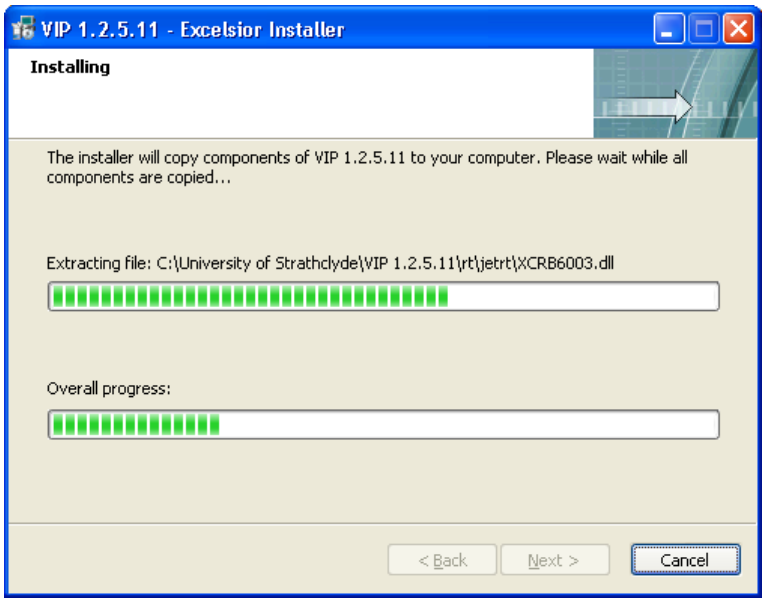

VIP 1.2.5.11 - Excelsior Installer
Installing
The installer will copy components of VIP 1.2.5.11 to your computer. Please wait while all components are copied...
Extracting file: C:\University of Strathclyde\VIP 1.2.5.11\rt\jetrt\XCRB6003.dll
Overall progress:
< Back
Next >
Cancel

Figure 3-15 VIP installation 6

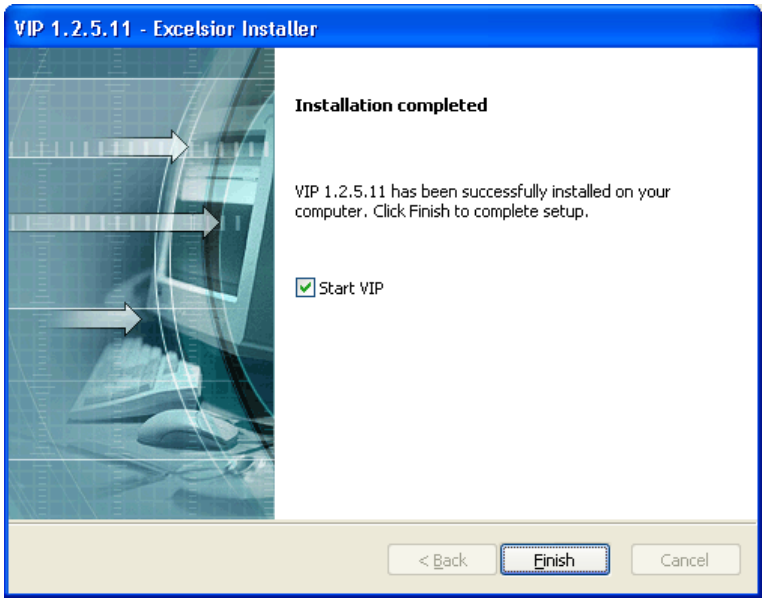


Figure 3-16 VIP installation 7

3.5.2 Un-installation

1. Click **Uninstall** from the **Programs** list in the Windows **Start** menu. A window asks whether you want to uninstall, as shown in Figure 3-17.

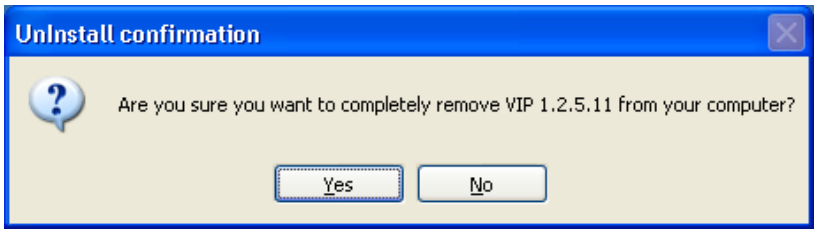


Figure 3-17 VIP un-installation 1

2. Click **Yes** to continue. A un-installation window pops up and ends up as the one shown in Figure 3-18.

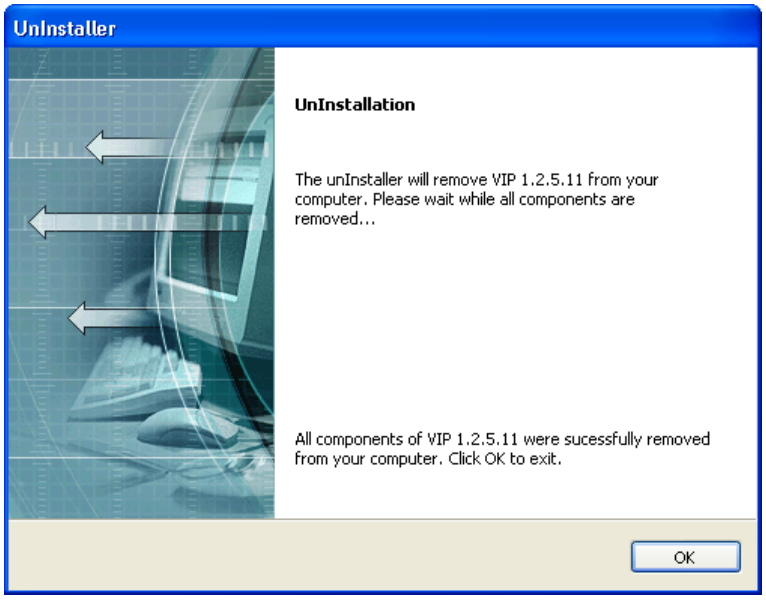

UnInstaller
UnInstallation
The unInstaller will remove VIP 1.2.5.11 from your computer. Please wait while all components are removed...
All components of VIP 1.2.5.11 were sucessfully removed from your computer. Click OK to exit.
OK

Figure 3-18 VIP un-installation 2

3. Click **OK** to finish the un-installation.

3.6 Log in

Start the installed VIP either through Programs list or desktop shortcut. **VIP Login** window as shown in **Figure 3-19** will be displayed.

Input **Login** and **Password**, which are provided by your VIP administrator. Check the **Server** IP address is the correct address of the Database Server, and click **Connect** button.

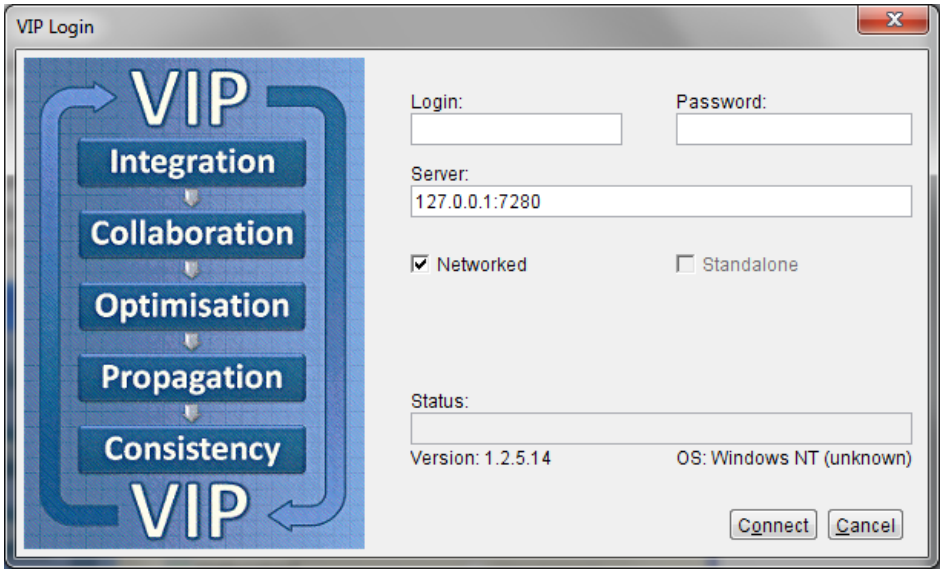


Figure 3-19 Login window

3.7 Basic configuration of the VIP client

3.7.1 FTP server configuration

After you log into the VIP, you will be presented the main user interface (that is initially blank). The first time when you log in the VIP, you will be prompted to configure the FTP server.

1. Click **Yes** to continue configure the FTP server from the VIP client.
2. A **FTP Configuration** window as shown in Figure 3-20 will be displayed.

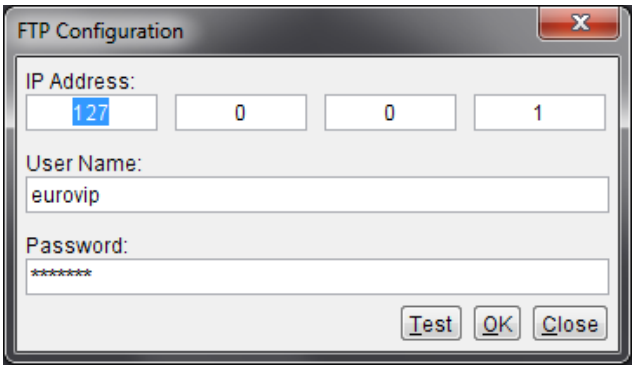


Figure 3-20 FTP Configuration

3. Enter the IP address of the SFTP server, and the **User name** and **Password** of the account for the SFTP server. Please be aware that the **User Name** and **Password** in

this window should both remain as configured during the SFTP server installation (see Section 3.4).

⚠ *If the servers are running on the same computer as the client, the local host IP Address can be used in the **IP Address** field, which points to the local host, in the **FTP Configuration** window.*

4. Click **Test** button in the **FTP Configuration** window to test the FTP settings. A **FTP Test** message will pop up if the test is completely successfully (see Figure 3-21).

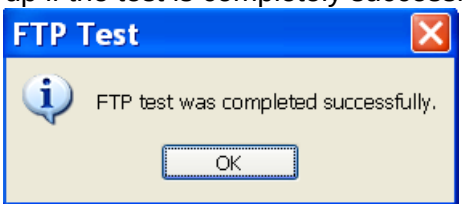


Figure 3-21 FTP Test message

⚠ *If FTP test is not successful, an error message as shown in Figure 3-22 will be displayed. In such cases, check FTP settings and ensure that appropriate IP Address is provided.*

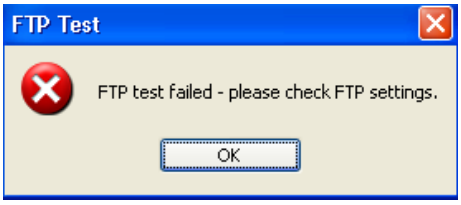


Figure 3-22 FTP Error message

5. Click **OK** in the **FTP Test** and **FTP Configuration** windows respectively.

To Edit FTP Configuration details:

1. Select **Edit FTP Preferences**… in the **Edit** menu in the VIP main user interface (see Figure 3-24). A **FTP Configuration** window with your current configuration preferences will be displayed as shown in Figure 3-24.
2. Edit the configuration details and click **OK**. This will save the new FTP preferences and close the window.

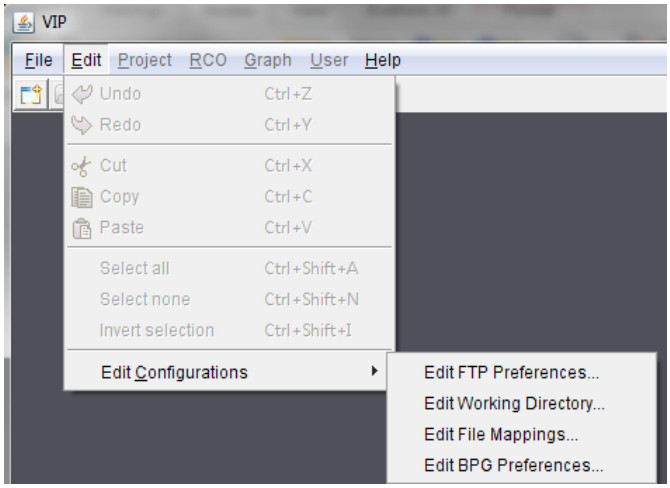


Figure 3-24 Edit FTP preferences

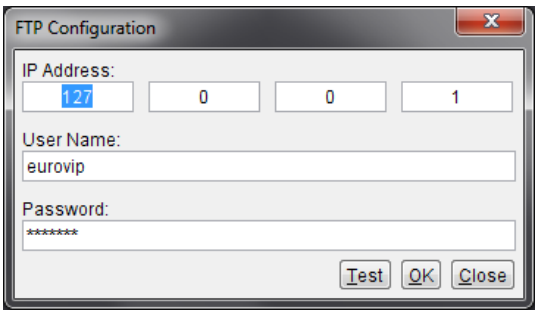


Figure 3-24 Current FTP preferences

3.7.2 Working directory configuration

If it is the first time you run the VIP, a **Working Directory Setup** message to configure VIP working directory will pop up.

1. Click **OK** in the **Working Directory Setup** window. A **Working Directory configuration** window will pop up as shown in Figure 3-25.

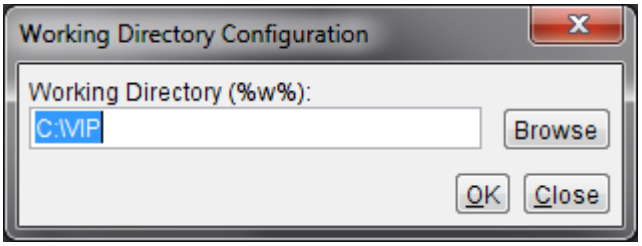


Figure 3-25 Working Directory Configuration window

2. Browse the path that VIP client uses as its working directory.
3. Click **OK** upon configuring the working directory. This will save the working directory configuration details and close the window.

4 Enable remote access – Changing enterprise firewall

If you run the VIP within your Local Area Network (LAN), then you do not need to read this section.

But if you run the VIP cross internet linking multiple Local Area Networks, and there are enterprise firewalls protect each network, then you might need to change firewall setting to enable VIP client access database server located in a remote network.

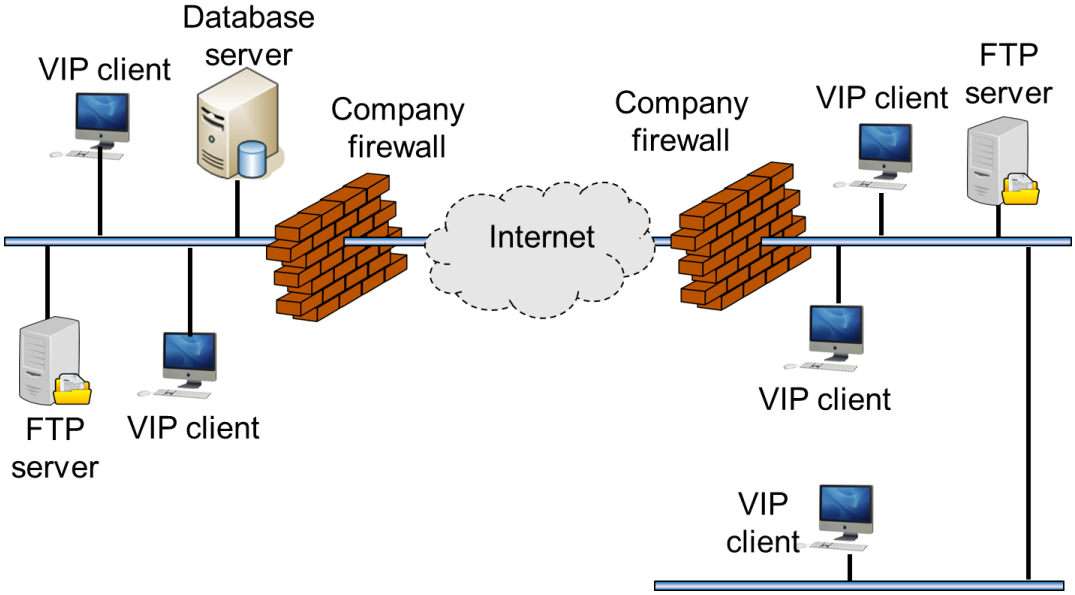


Figure 4-1 Network architecture

4.1 Access cross VPN

If the VIP client is in one LAN, the database server is in another LAN, and the two LANs are linked through VPN, or the VIP client accesses the company network through VPN, then you **do**

not need to change any setting, as this will be the same as you access the database server from the LAN where the server is.

4.2 Access cross Internet without VPN

If you access the database server via internet without using VPN, then that means you access the server through the firewall that protects the network where the server is. In this case, the setting of the firewall needs to be changed to enable external access to the database server.

The VIP client accesses the server through port 7280. Therefore, you only need to ask your IT support team to change the firewall setting to enable access to the port 7280 of the server. This can be done easily on the firewall by adding a rule.

Part Two: User manual

5 Manage networks

You can manage a network either through “Managing network” menu or during the process of creating a project.

Click **Manage Networks** from the File menu, the **Network Management Dialog** will appear.

> *You can also create a network during the process of creating a project in **Project Creation Wizard** – step 2 of 4 – network details window (Figure 6-3).*

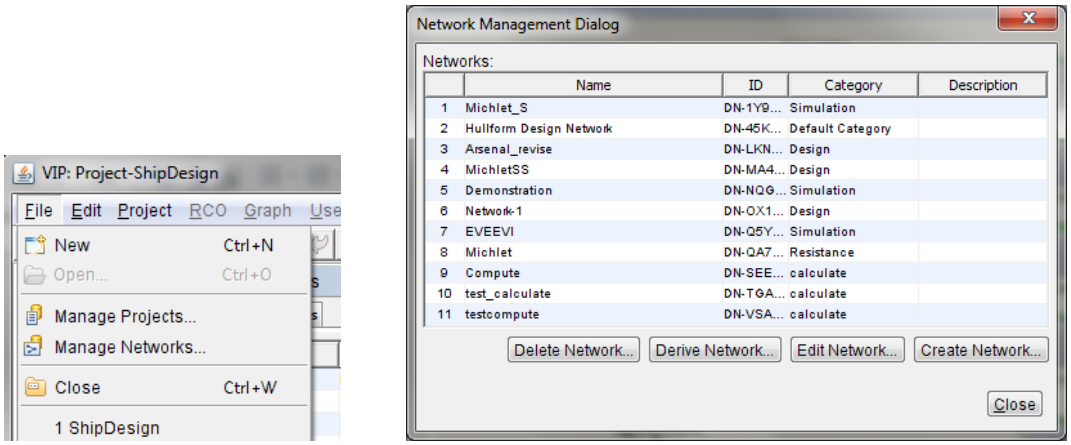


Figure 5-1 Managing network

5.1 Create networks

1. Click **Create Network** button in the **Network Management Dialog**, and the network editor appears (see Figure 5-2).

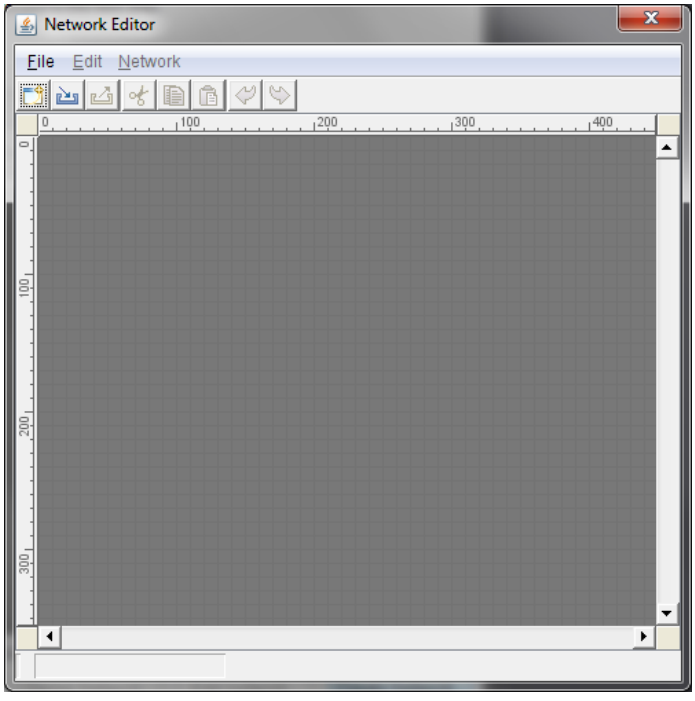


Figure 5-2 Network editor

2. Click either the **Create a new network** button on the toolbar or the **New** option in the **File** menu (see Figure 5-3) to create a new project network. The **New Dependency Network** window will be opened as illustrated within Figure 5-4.

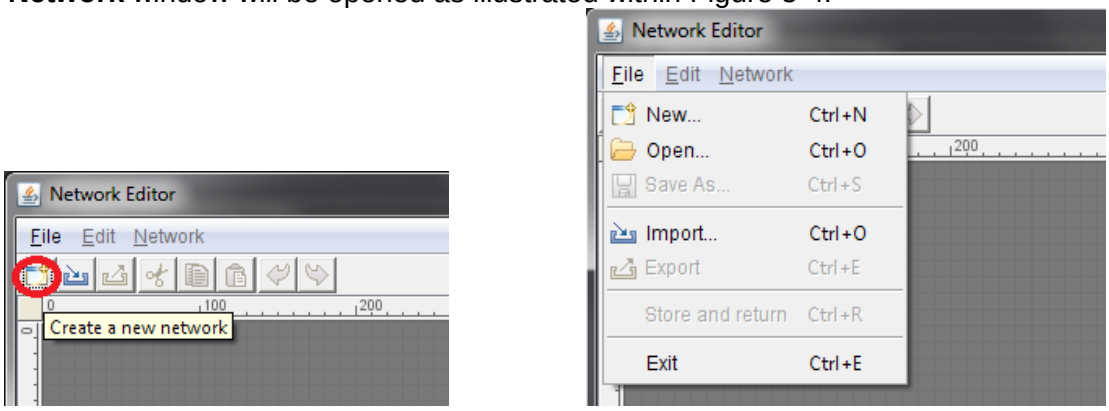


Figure 5-3 Create new project network

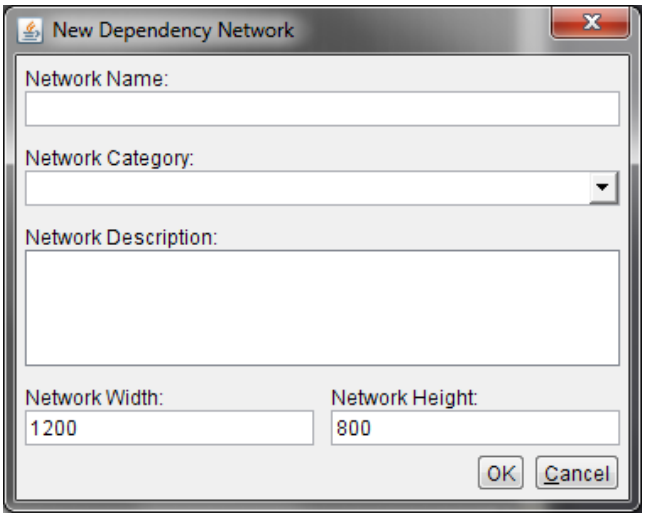


Figure 5-4 New Dependency Network

3. Input **Network Name** and **Network Description** (optional) in the **New Dependency Network** window. Click **OK** button to save the network details and proceed to the Network Editor interface.

   ⚠ *Please note that on clicking **OK** button, the **Edit** menu and **Network** menu would become enabled in the Network Editor interface (see Figure 5-5), which is different from the previous Network Editor (see Figure 5-2).*

5.1.1 Add tool nodes

VIP provides data and tool level support with respect to projects and versions during the RBD process. The VIP provides support to illustrate the consistency and dependency of the data used by the tools, as well as ensuring that the right data gets to the right tool at the right time.

To add tools used to define a process:

1. Click **Add Tool** on the **Network** menu, as shown in Figure 5-5. A **Create Tool Item Dialog** window displays (see Figure 5-6).

2. Input **Tool Name**, **Tool Description**, **Tool Type** and **Function** details in the **Create Tool Item Dialog** window, and click **Okay** button.

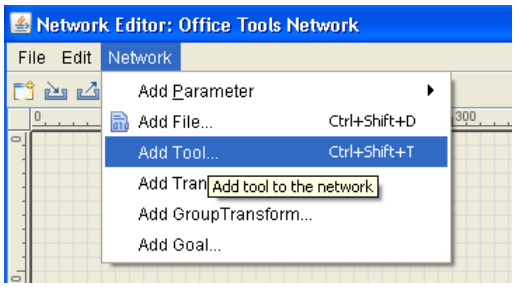


Figure 5-5 Add Tool

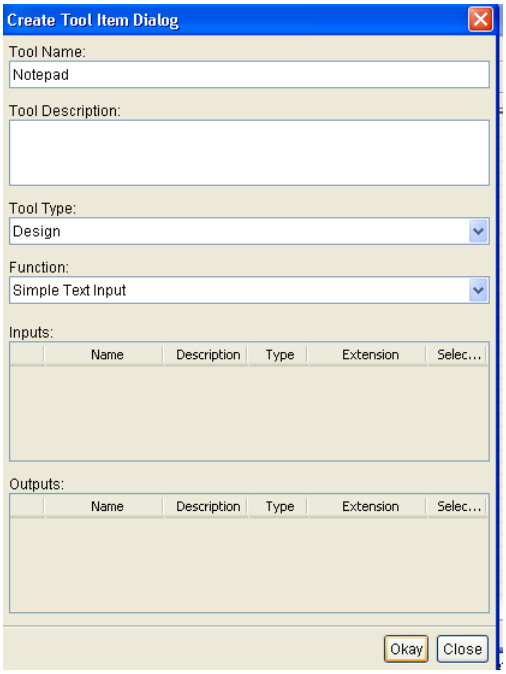


Figure 5-6 Create Tool Item Dialog

3. Similarly create other tools in the process. Once the tools are created, they will be displayed in the Network Editor interface as shown in Figure 5-7.

5.1.2 Add file nodes

To create data to be used by the tools:

1. Click **Add File** on the **Network** menu, as shown in Figure 5-7. A **Create File Item** window will be displayed as shown in Figure 5-8.

2. Input information in the **General Details** and **File Details** in the **Create File Item** window, and click **OK** button.

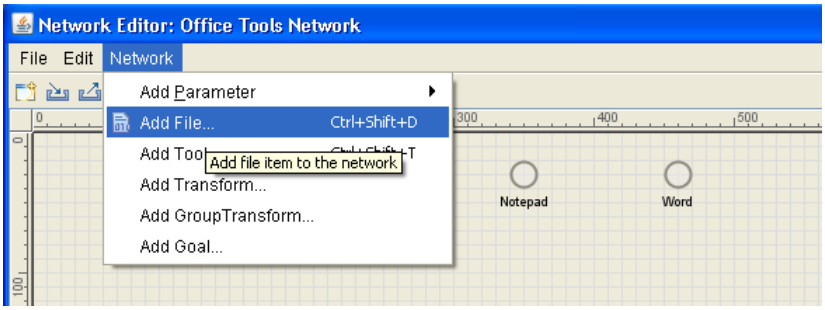


Figure 5-7 Add File

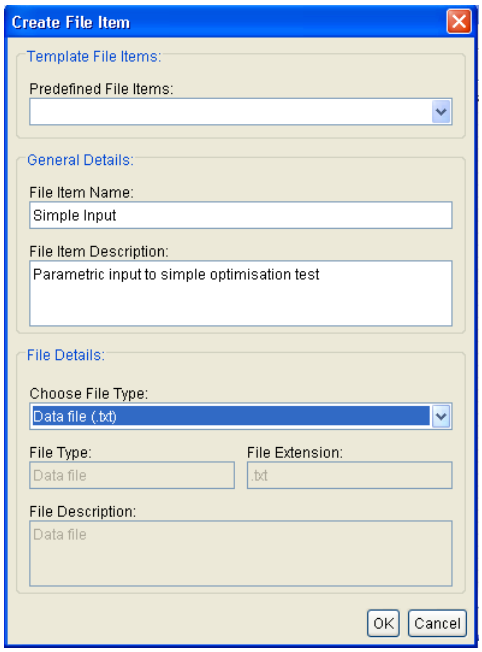


Figure 5-8 Create File Item Dialog

3. Similarly create other files in the process. Once the files are created, they will be displayed in the Network Editor interface as shown in Figure 5-7.

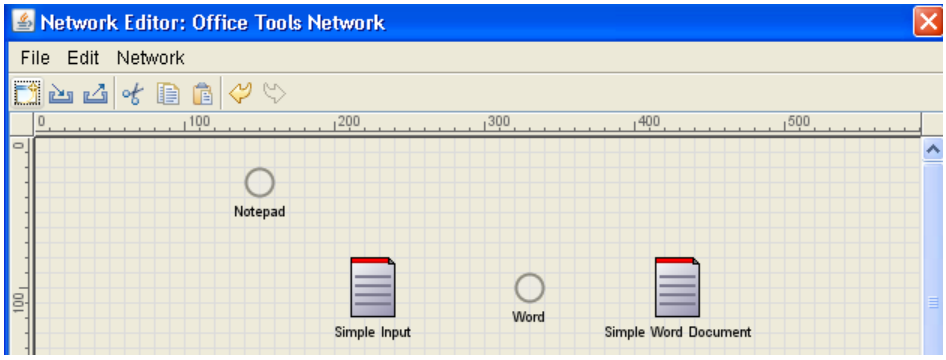


Figure 5-9 Files created

⚠ *Please note that, other data features such as **Add Parameters** or **Add Transform** or **Add Group Transform** or **Add Goal** in the Network menu (see Figure 5-5) could be added to the Project Network depending on the type of data used by the tools or on the type of workflow required for the project create:.*

- *To create parameters, please see Section 5.1.4*
- *To create transforms, please see Section 5.1.5*

- *To create group-transforms, please see Section 5.1.6*

5.1.3 Add dependency

A dependency represents the sequence in which the actions can be executed. To create dependency of the data used by the tools to ensure that the right data gets to the right tool at the right time:

1. Right click the selected tool in the **Network Editor** window (see Figure 5-10). Selecting the **Edit** option will enable the **Edit Tool Item Dialog** window to be opened as shown in Figure 5-11.

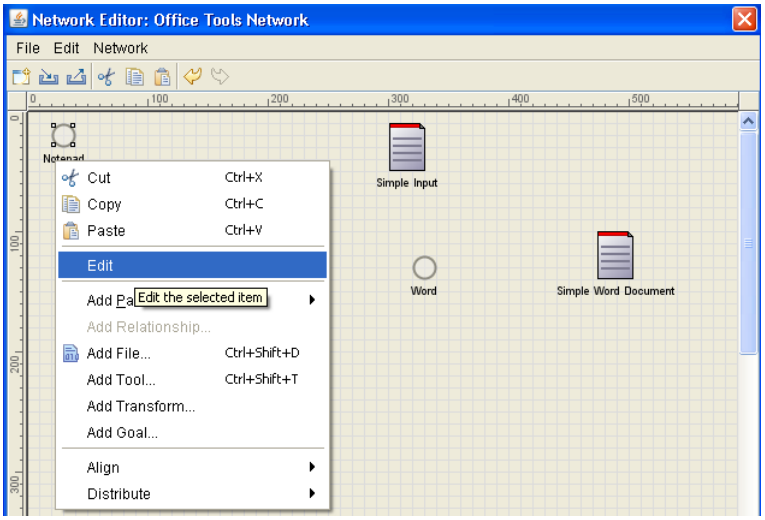


Figure 5-10 Edit tool

2. Select the input and the output data for the tool in the **Inputs** and **Outputs** fields in the **Edit Tool Item Dialog** window.

3. Create dependency by clicking the **Edit** button.

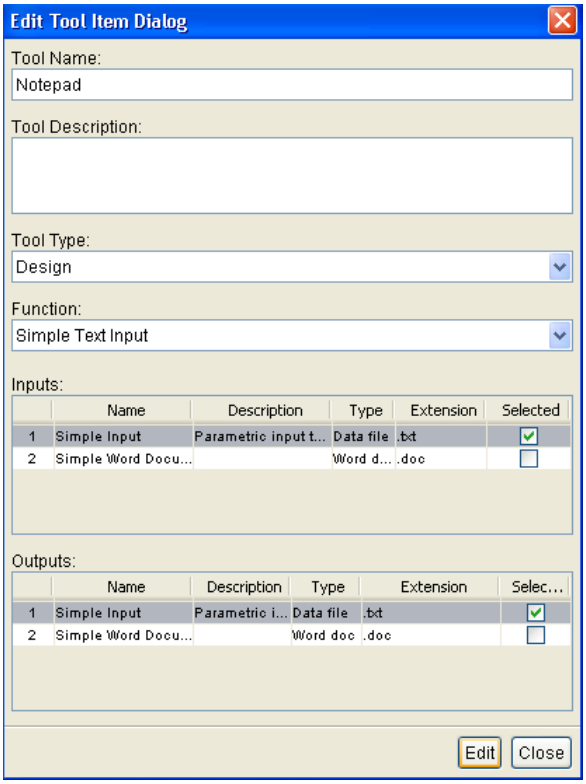


Figure 5-11 Edit Tool Item Dialog

4. Similarly create dependencies for other tools in the process. Figure 5-12 shows an example process with dependencies created between tools.

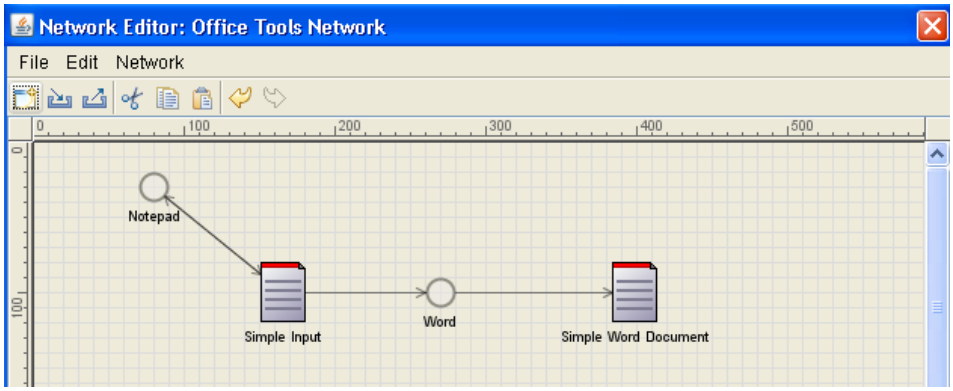


Figure 5-12 Network dependency

5. Click **Store and return** button in the **File** menu in the Network Editor interface, after creating all the dependencies for the current process, to store the network and return to the **Project Creation Wizard –step 2 of 3 – network details** window (as shown in Figure 6-3).

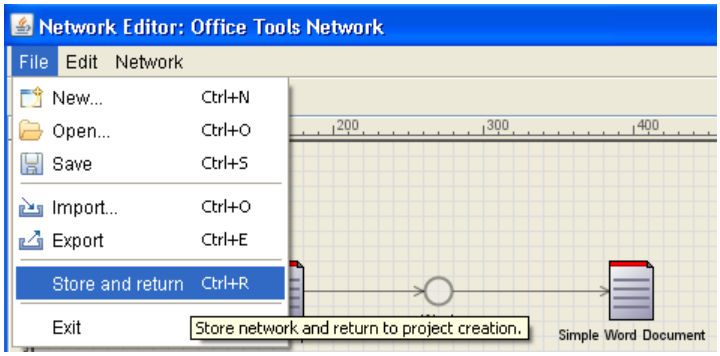


Figure 5-13 Store the network

⚠ *To ensure that the new network created has been added to the Dependency Network list, clicking on the drop down menu of **Dependency Network** will display the networks created (see Figure 5-14).*

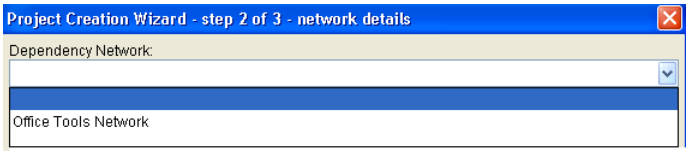


Figure 5-14 Available dependency networks

6. Click **Next** button in the **Project Creation Wizard –step 2 of 3 – network details** window (as shown in Figure 6-3) to proceed to the next stage of project creation (see Figure 6-4).

5.1.4 Add parameter nodes

A data file has a lot of information being created while a design process. A designer may want to make some of the information persistent in the database and compare between each other to find out the best parameter set.

You can make a parameter and transform for saving an individual parameter or group-transform for saving group of parameters.

1. Click **Add Parameter** on the Network menu, as shown in Figure 5-15. There are 7 kinds of type of parameters, and it is available to create not only one element parameter, but an 1D or 2D array of parameters.

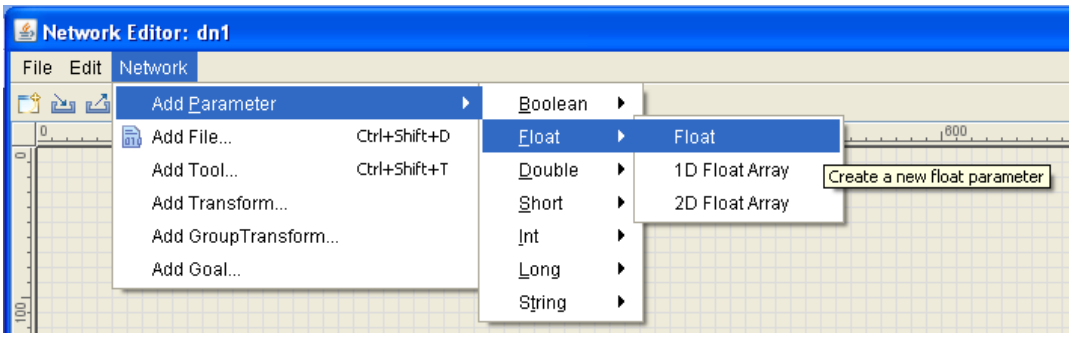


Figure 5-15 Add Parameters

2. For one element of a float parameter, the dialog looks like as shown in Figure 5-16. Input information in the **Name, Acronym, Units, Description** and **Default Value** in the **Crete Float Parameter Dialog window**, and click **OK** button.

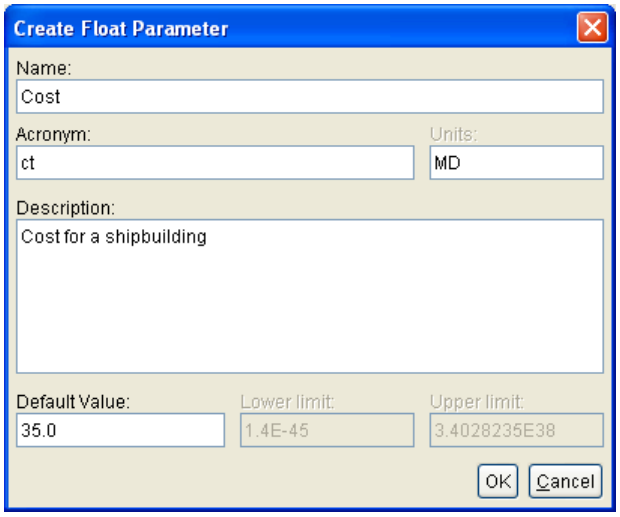


Figure 5-16 Crete Float Parameter Dialog

3. For an array of a float parameter, the dialog looks like as shown in Figure 5-17. You can additionally set a size of an array before input a default value.

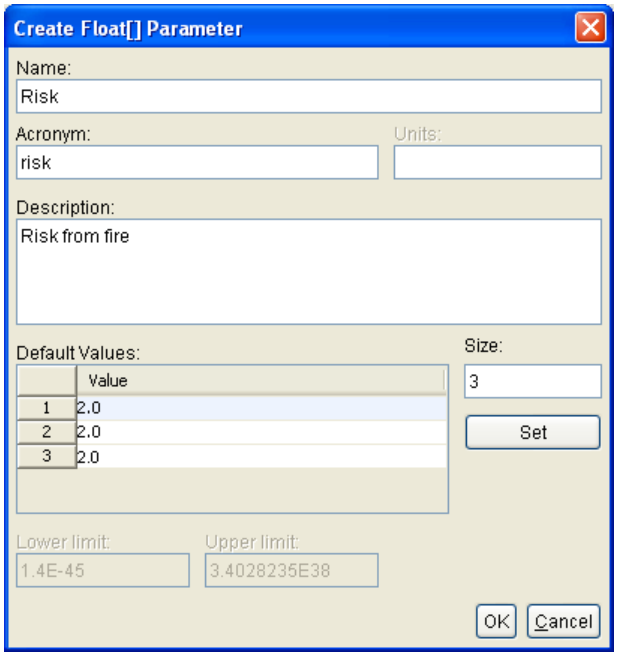


Figure 5-17 Crete Array of Float Parameter Dialog

5.1.5 Add transforms

There are 2 kinds of transforms, one is a from-file-to-parameter transform and the other is a from-parameter-to-file.

The from-file-to-parameter transforms is a process in which a parameter value is saved at specific location of a file. The from-parameter-to-file transforms is a process in which a specific value is extracted from a file and set a parameter with the value.

To create transforms to ensure that a file and a parameter to be used should exist before.

1. Click **Add Transform…** on the Network menu, as shown in Figure 5-18. A **Transform Creation Dialog** window will be displayed as shown in Figure 5-19.

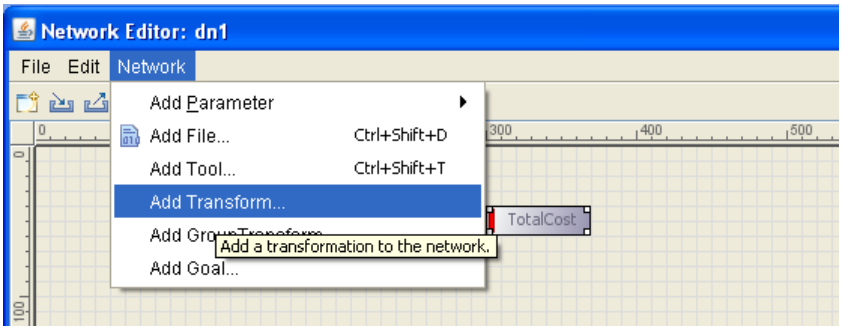


Figure 5-18 Add Transform

2. Input information in the **Transformation Name box,** and select the check box according to a type of transform which you are going to create.

3. Select a file which the transform should use as a source or destination on in the **File combo box**.

4. Choose parameters to be used for this transform in the parameters list.

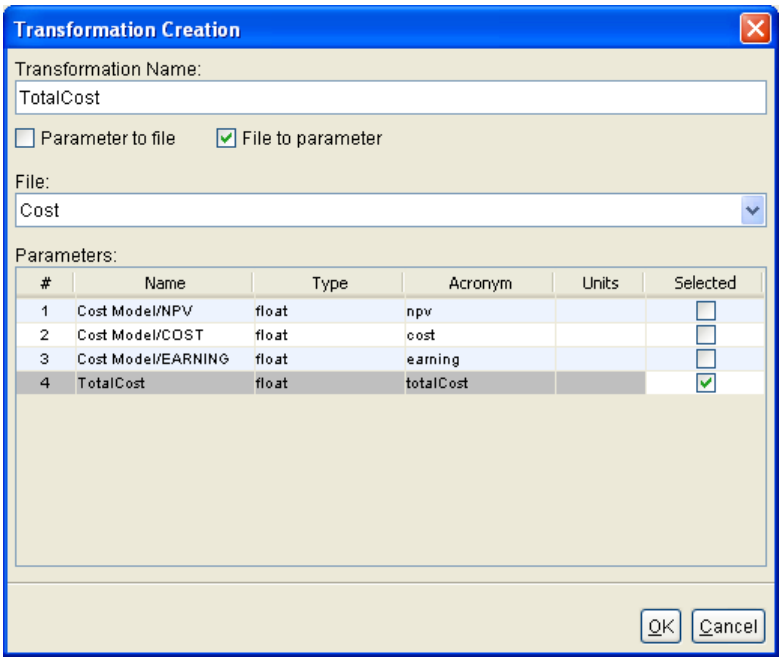


Figure 5-19 Transform Creation Dialog

5. Click **OK** button, and new transform node is created and a link between a file node and a parameter node is also created automatically as shown in Figure 5-20.

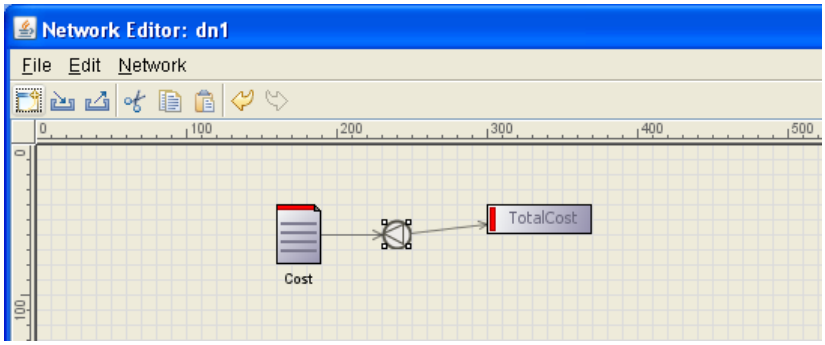


Figure 5-20 Created a Transform and Parameter

5.1.6 Add group-transforms

In many cases, the number of parameters is so big that it might seem to be tiresome job to create a parameter and transform for each everyone. A group-transform using XML parameter template file could be good way to handle the cases.

1. Click **Add GroupTransform…** on the **Network** menu, as shown in Figure 5-21. A **Group Transformation Creation** window will be displayed as shown in Figure 5-22.

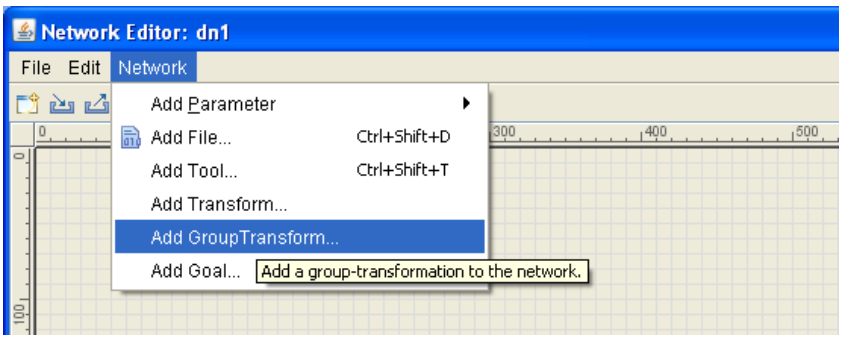


Figure 5-21 Add GroupTransform

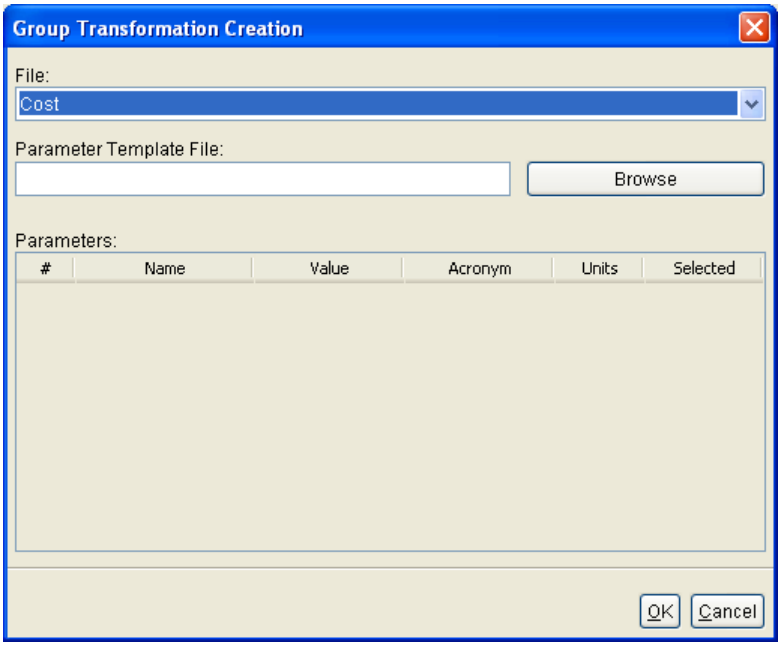


Figure 5-22 Group Transformation Creation Dialog

2. Select a file which the group-transform should depend on in the **File combo box**. The selected file will be used to check whether this group-transform is up-to-date and it doesn't necessarily mean the file has the information to be used for the group-transform, of course, it has though.

3. Specify the **Parameter Template File** location using **Browse button**. The parameter template file should be a XML file formatted like below.

```
<Domain name="Cost Model">

        <Param name="NPV" value="251937.644734"/>

        <Param name="COST" value="255995.044646"/>

        <Param name="EARNING" value="258715.362818"/>
```

</Domain>

4. After specifying the parameter template file, you can choose parameters for the group-transform in the list.

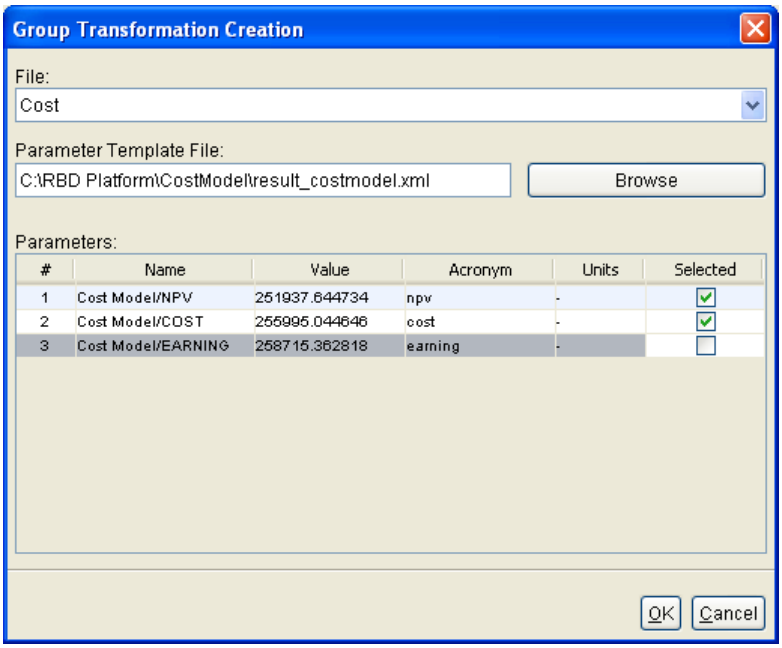


Figure 5-23 Choose Parameters for Group-Transform

5. Click **OK** button, and new group-transform node is created and a node of group of parameters corresponding to the group-transform is also created automatically.

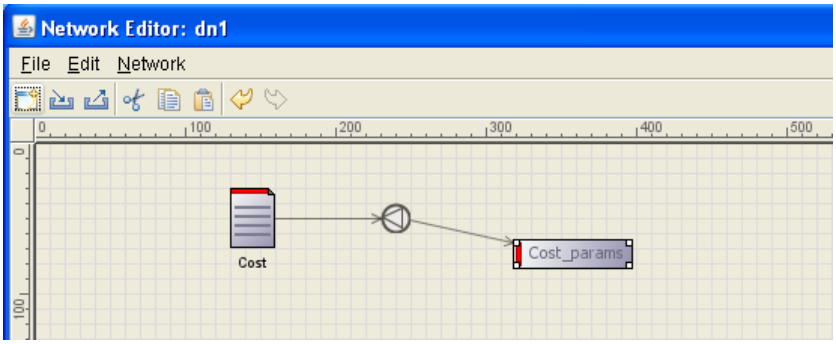


Figure 5-24 Nodes for Group-Transform and Group of Parameters

5.1.7 Remove tool, file, parameter, dependency and transform

During creating a network, sometimes you need to remove a tool, file, parameter, dependency, or transform. To remove a tool, file, parameter, dependency and transform node, right click the node, then select “Cut”.

5.2 Edit, derive and delete networks

5.2.1 Edit networks

To edit a network, select the network from **Network Management Dialog**, and click **Edit Network** button. The **Network Editor** window will pop up, and you could add or remove nodes and dependencies as showed in Section 5.1.

5.2.2 Derive networks

To create a network based on an available one, you could derive a network which will create a new network with all nodes and dependencies of the available network.

To derive a network:

1. Select the network that will be based on from **Network Management Dialog**, and click **Derive Network** button.

2. Input the new **Network Name**, select suitable **Network Category**, input proper **Description**, and click **Derive** button.

3. The **Network Editor** window will pop up, with exactly the same available network. However, this is a new network, and you could add or remove nodes and dependencies as showed in Section 5.1.

5.2.3 Delete networks

To delete a network, select the network from **Network Management Dialog**, and click **Delete Network** button. Click **Yes** if you want to delete the selected network.

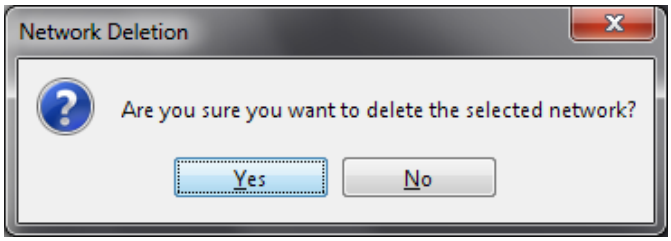


Figure 5-25 Delete network

6 Create projects

Projects are defined from the VIP Client. After logging on to the Client, the user is presented with the main user interface (that is initially blank) and subsequently has the facility to either create a new project, or open an existing project from the database.

To create a new project, click either the **Create new project** button on the toolbar or the **New** option in the **File** menu (see Figure 6-1). The new project dialog window will be opened as illustrated within Figure 6-2.

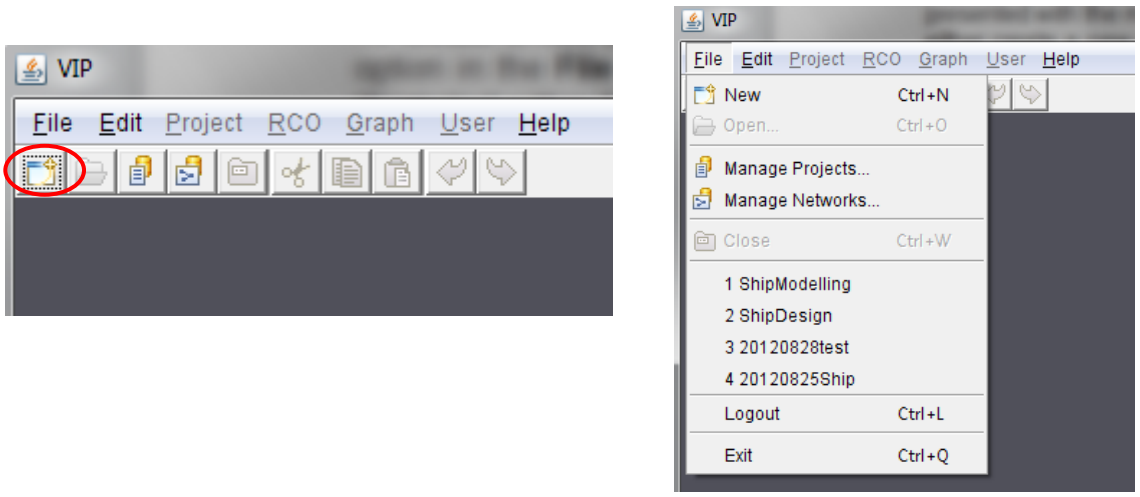


Figure 6-1 Create new project

6.1 Create project basic details

Input details in the **Project Name**, **Project description** and additional information fields as deemed important in the **Project Creation Wizard - step 1 of 4 - project details** window.

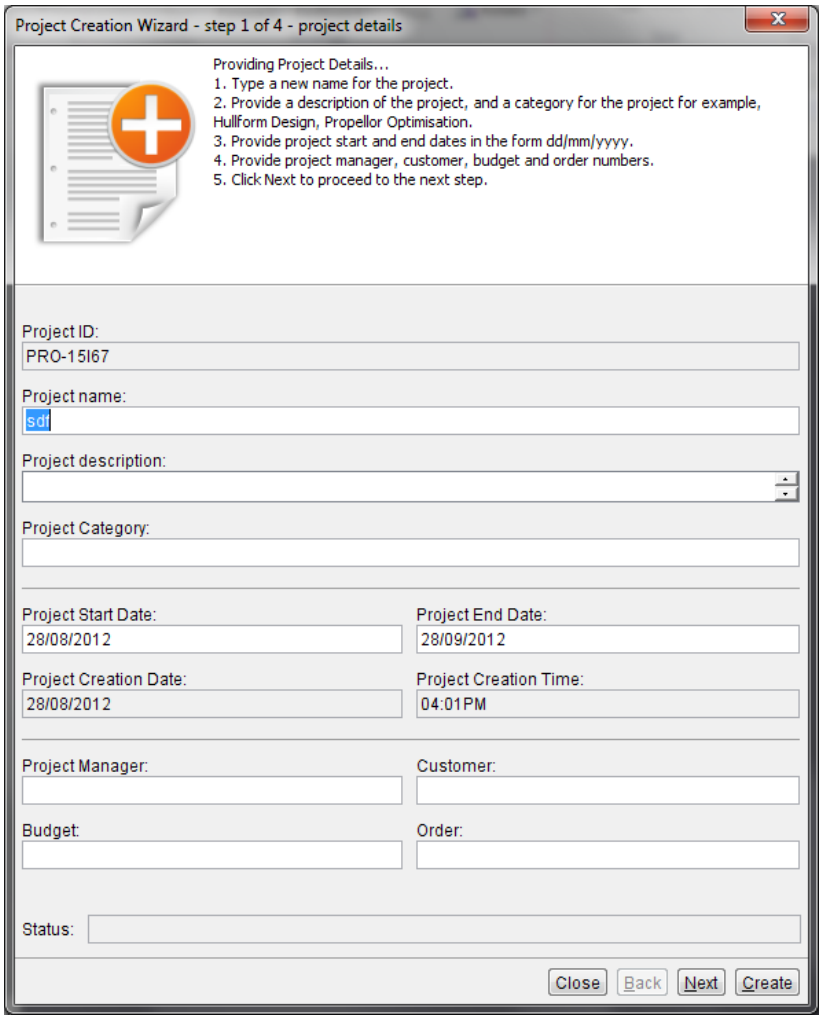


Figure 6-2 New project creation – project details

Click **Next** button to proceed to the next stage of project creation (see Figure 6-3).

6.2 Select project network

Each project has a dependency network.

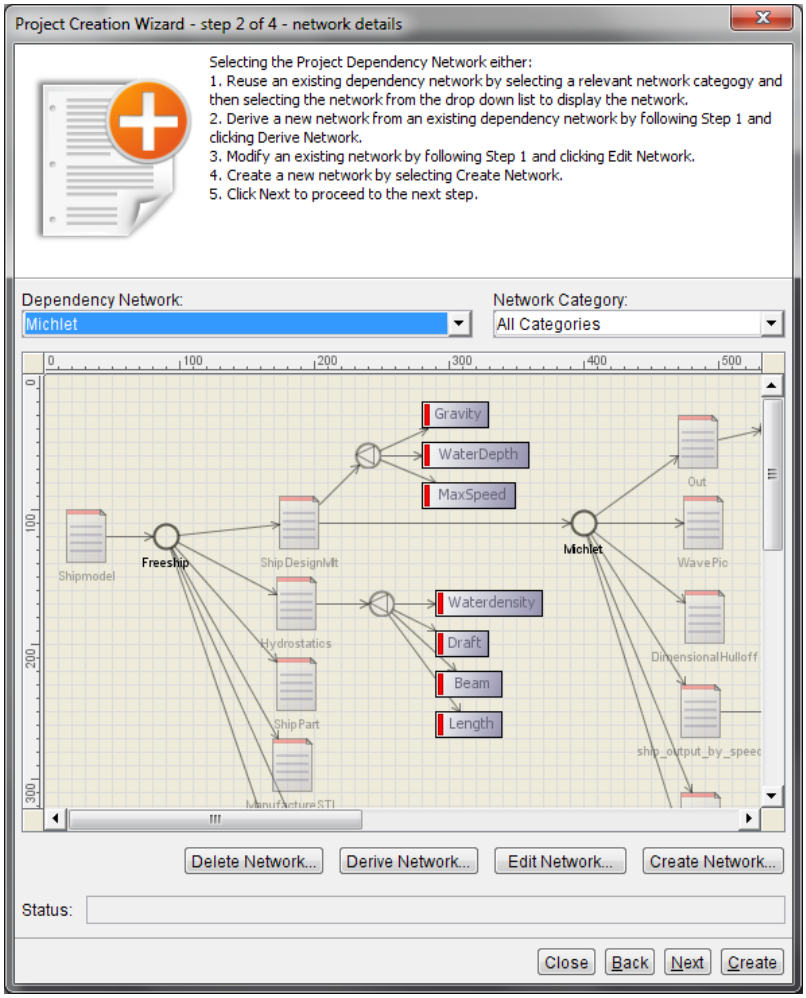


Figure 6-3 New project creation – network details

Regarding dependence network, you have the following four options:

- Create a new network from scratch. See section 5 for detailed instruction.
- Use an available network: Select a network from **Dependency Network** dropdown list.
- Edit an available network and use it: Select an available network from **Dependency Network** dropdown list, and click **Edit Network** button. See section 5 for editing network.
- Derive a new network from an available network: This is to create a new network on the basis of an available network.

    1. Select an available network from **Dependency Network** dropdown list
    2. Click **Derive Network** button.
    3. Input name for the new network. Input network category or select an available category. Click **OK**, the network editor window shows. See section 5 for editing network.

Once you have chosen the network, click **Next** to the next step.

6.3 Import project files

Preliminary files can be provided during the project creations, so that the files can be uploaded to the FTP server upon creation the project, and will be available for people who will configure and run the project.

- *If you do not have files to be uploaded, or do not want to upload at this stage, just click Next button to go to the next step.*
- *Files can also be uploaded to the SFTP server after creating the project while you configure the project.*

1. Click the **Add** button on the **Project Creation Wizard – step 3 of 4 – import project files** window (as shown in Figure 6-4) to upload files to the FTP server. An **Add Project File** window will be displayed as shown in Figure 6-5.

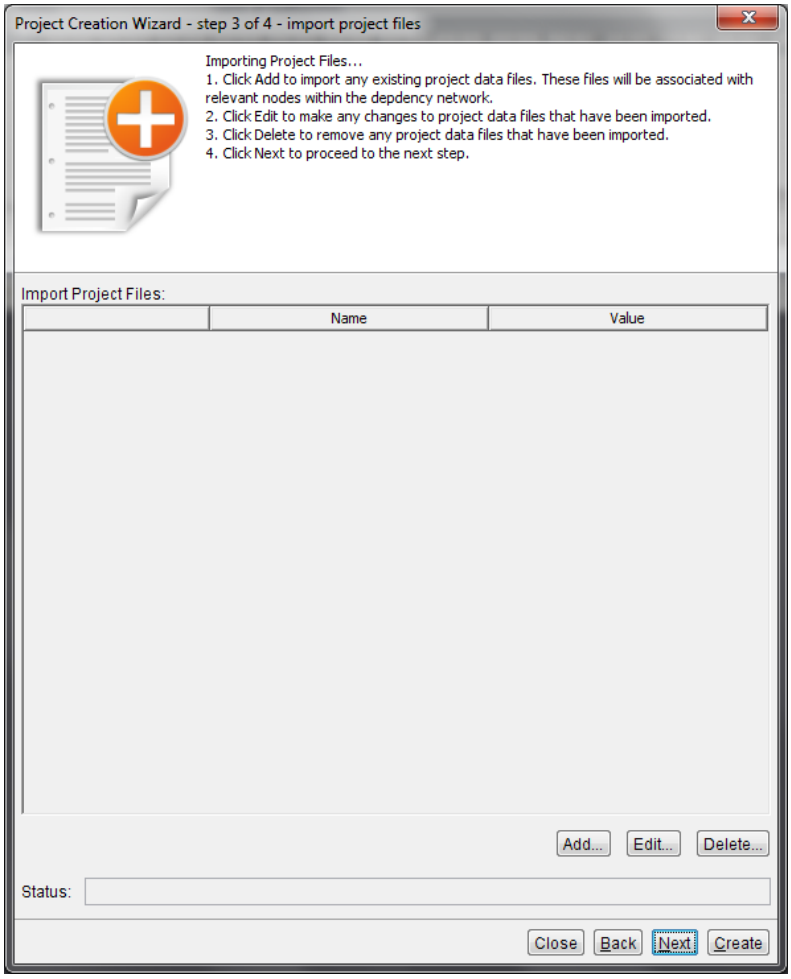

Project Creation Wizard - step 3 of 4 - import project files
Importing Project Files...
1. Click Add to import any existing project data files. These files will be associated with relevant nodes within the depdency network.
2. Click Edit to make any changes to project data files that have been imported.
3. Click Delete to remove any project data files that have been imported.
4. Click Next to proceed to the next step.
Import Project Files:
Name
Value
Add...
Edit...
Delete...
Status:
Close
Back
Next
Create

Figure 6-4 New project creation window – preliminary data

2. Select a file, from the displayed list of files in the **File Name** field, to which the file should be added (see Figure 6-5).

3. Specify the file location on the local computer, which is where the file is located, so that the VIP can locate and upload the file to the FTP server.

4. Click **OK** button to confirm the selection.

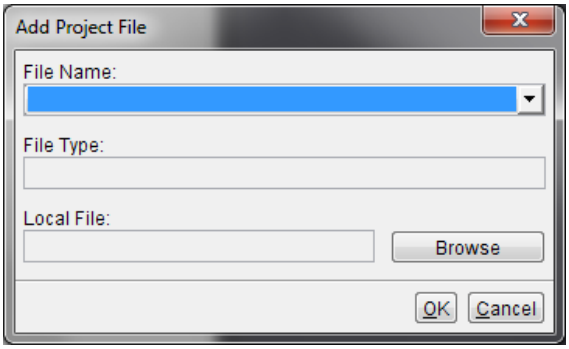


Figure 6-5 Add project file

5. Similarly add more files if there are.

If you will use any available transformation templates for the project, click **Next**. Otherwise, click **Create** button to create the project.

6.4 Select transformation templates

> *If you do not reuse any transformation templates, click Create button to create the project.*

Transformation templates could be reused from previous project if similar parameter and files have been configured transformation before. Figure 6-6 shows transformation templates.

1. Click **Search** for all available transforms stored in the database server.
2. Select the templates you want to use for the project.

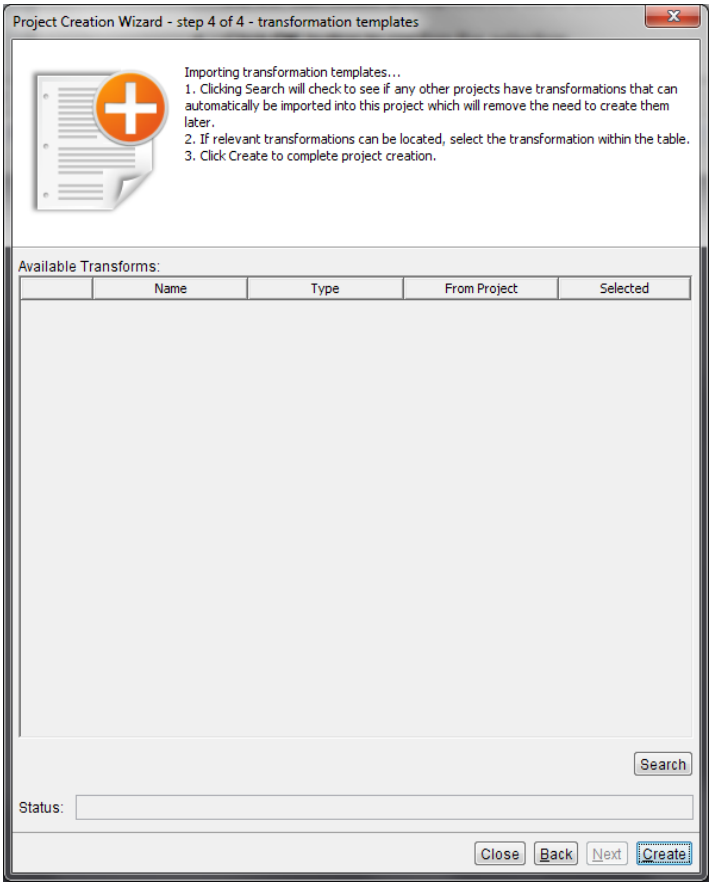

Project Creation Wizard - step 4 of 4 - transformation templates
Importing transformation templates...
1. Clicking Search will check to see if any other projects have transformations that can automatically be imported into this project which will remove the need to create them later.
2. If relevant transformations can be located, select the transformation within the table.
3. Click Create to complete project creation.
Available Transforms:
Name
Type
From Project
Selected
Search
Status:
Close
Back
Next
Create

Figure 6-6 New project creation – Transformation templates

3. Click **Create** button to create the project and save the project related information within the database. This will close the **Project Creation Wizard** and the user will be presented VIP Graphical User Interface (GUI) showing the **Project Version Details**, **Integrated Tools** and **Dependency Network** for the particular project created (see Figure 6-7).

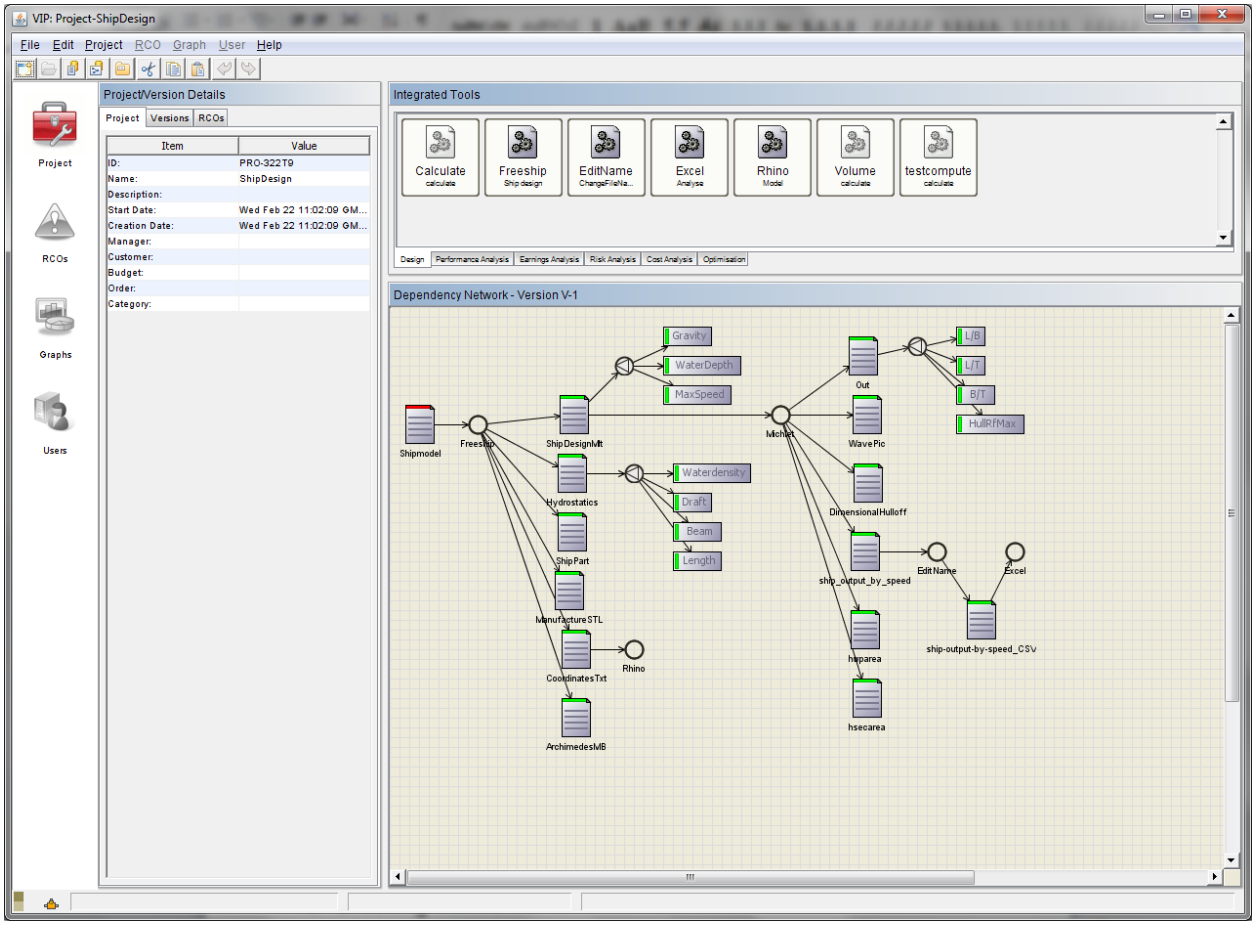


Figure 6-7 Populated information of the project created

7 Configure project - Integrating tools

Integrating a tool involves establishing the data that the tool will use and generate through execution, as well as identifying the location of the tool on the local file-system and any command line arguments that the tool may require.

To integrate the tools created in a project process:

1. Right click the selected tool in the Dependency Network window (see Figure 7-1).

2. Select **Integrate Tool** in the **Tools** menu. Selecting this option will invoke the **Tool Integration Wizard** window (which is initially blank), which will present fields to add the tool details (see Figure 7-2).

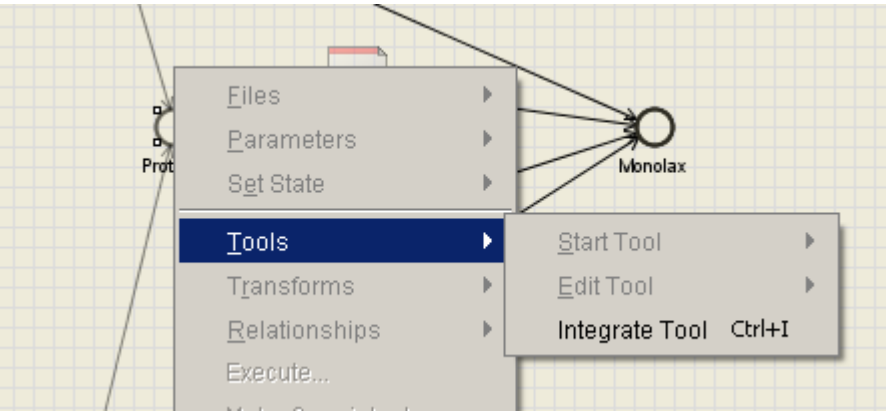


Figure 7-1 Integrate tool

7.1 Add tool details

1. Specify the location of the **Tool Executable** on the local file-system (an example of an executable is given in Figure 7-2).

2. Add **Tool Arguments**, if there are any. The number of arguments is dependant entirely on the tool, and therefore may not always be necessary.

   ⚠ *The facility to specify tool argument has been included to assist with automation aspects such as file loading.*

   ⚠ *Please note that each item in the Argument List must represent a single argument.*

   ℹ *For example*

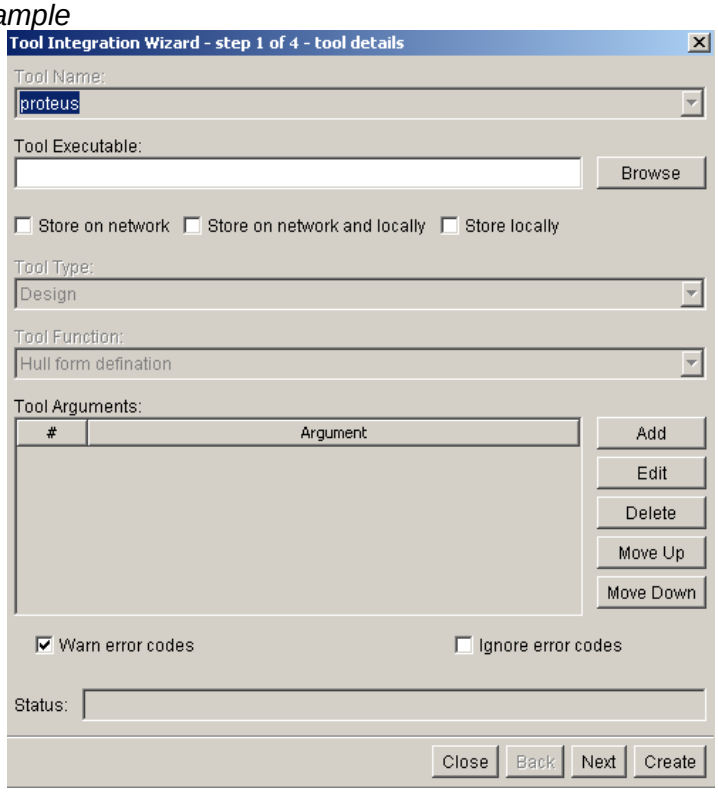


Figure 7-2 Tool Integration Wizard – tool details

3. Click **Next** button in the **Tool Integration Wizard –step 1 of 4 – tool details** to save the selected tool details and proceed to the next stage (see Figure 7-3).

7.2 Add tool execution details

1. Specify the **Working Directory** in the **Tool Integration Wizard – step 2 of 4 – execution details** window (see Figure 7-3).

   ⚠ *The **Working Directory** is mainly used by certain tools to resolve file paths, and therefore may not always be necessary.*

2. Add **Environment Variables**, if any.

3. Select **Automatically Execute** (which is optional) to have the tool automatically executed.

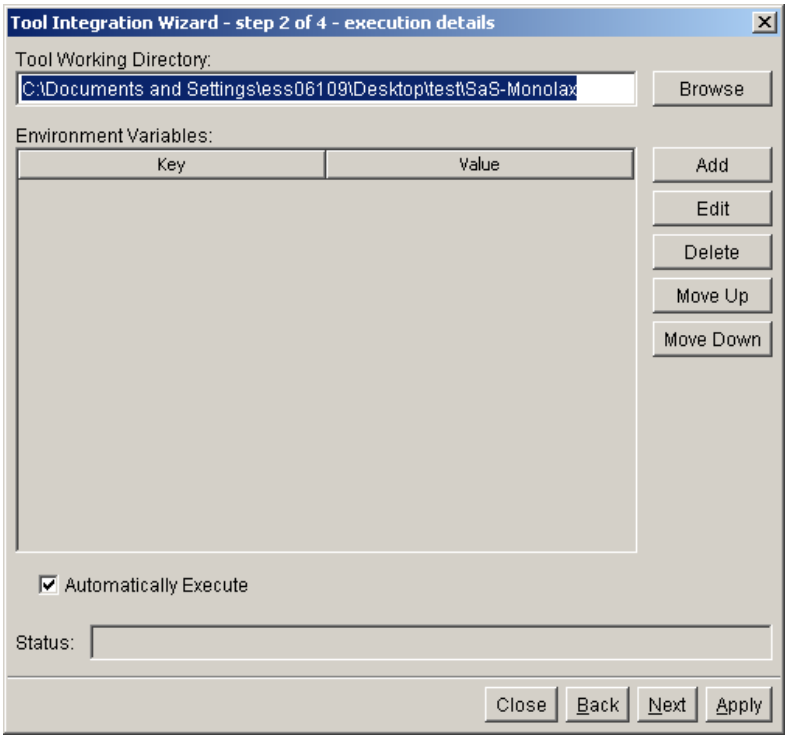


Figure 7-3 Tool Integration Wizard –execution details

4. Click **Next** button to save the selected tool execution details and proceed to the next stage (see Figure 7-6).

7.3 Tool input and output data management

7.3.1 Input

The input files are the files feed into tools, which are downloaded to local computer where the tool is from the SFTP server.

There are two options to specify the input folder for downloading files.

If all the files are in the same folder, you can specify the **Input folder** in the **Tool Integration Wizard – step 3 of 4 – data management/Input** window to define where the data file is to be downloaded at run-time (see Figure 7-4).

Alternatively, if multiple files are supposed to be downloaded to different folders in the local machine, you can define the folders by checking **Add Input Files**. Then by clicking **Add File** button, select file item from the **Downloaded File Item** list, and specify the downloading directory in the **Input Directory** box as shown in Figure 7-5.

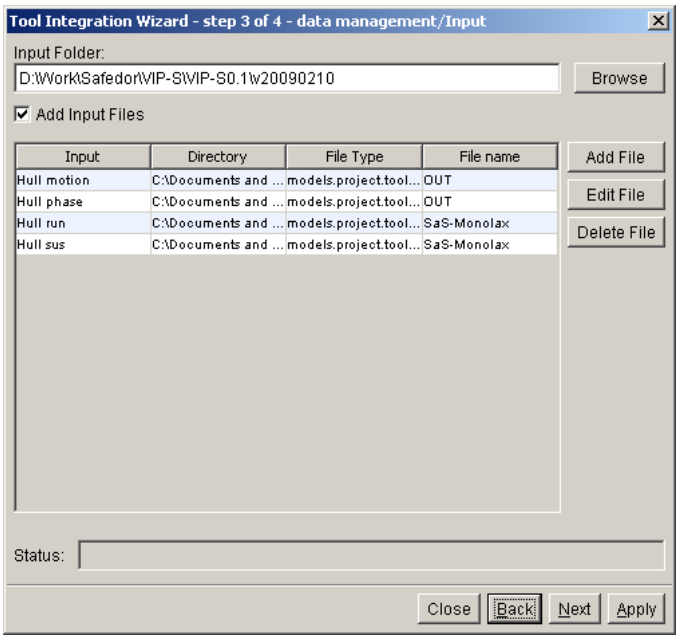


Figure 7-4 Add Input Variable

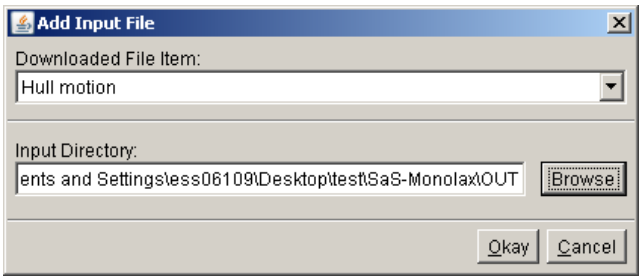


Figure 7-5 Specify Input directory for each item

Click **Next** to go to next step after finishing specify the input directories.

7.3.2 Output

If there is any output files from the tool need to be uploaded to the file server, this can be done through selecting **Use Tool Output Detection** as shown in Figure 7-6 to define the location in the local computer from where the file will be uploaded to the database. Selecting this option will enable the buttons to add the output variable.

1. Click **Add** button to add output detector to the list. An **Add Output Variable** window will be opened as shown in Figure 7-7.

2. In the **Add Output Variable** window, specify the **Mapped File Item** and **Output Directory**. Select **Output File Type** if **Detect Type** is checked, or configure the **Output File Name** if **Detect Name** is checked.

3. Click **Okay** button in the **Add Output Variable** window to create output file detector. The output file details will be added to the tool output detection list as shown in Figure 7-6.

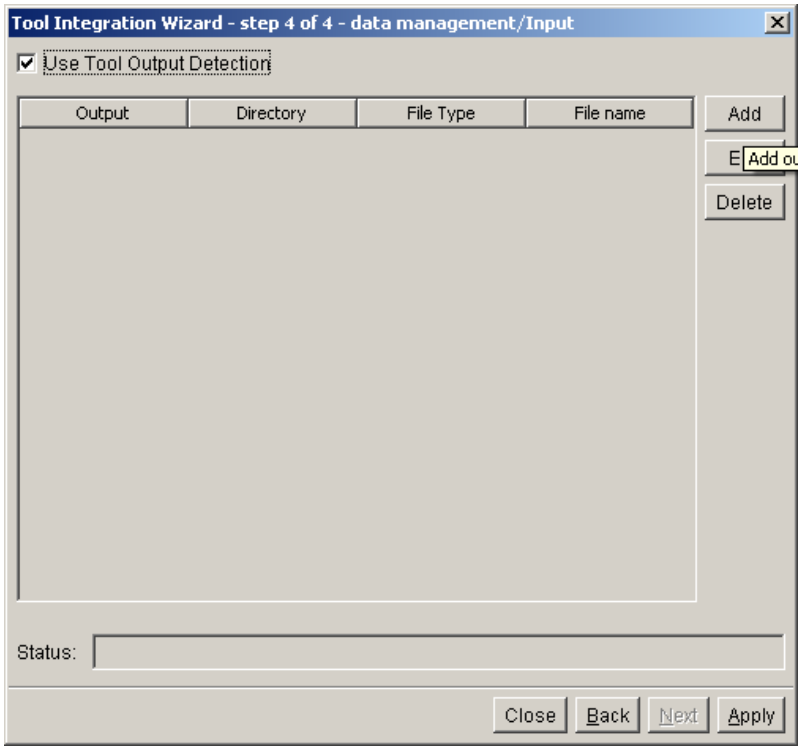


Figure 7-6 Tool integration – Output

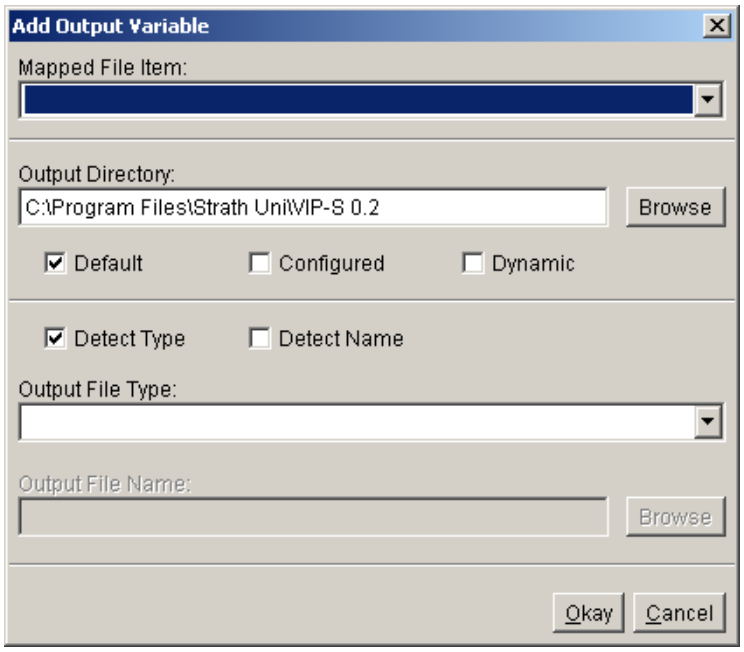


Figure 7-7 Tool integration – Output file configuration

4. Click **Apply** button in the **Tool Integration Wizard – step 4 of 4 – data management/Input** window to integrate the tool. Once the tool is integrated, it would be displayed as an icon within the integrated tools section of the VIP GUI (see Figure 7-8), which is different from the previous VIP GUI before integration (see Figure 6-7). The integrated tools may represent either: design, consequence analysis, fault tree analysis, or simulation for examples.

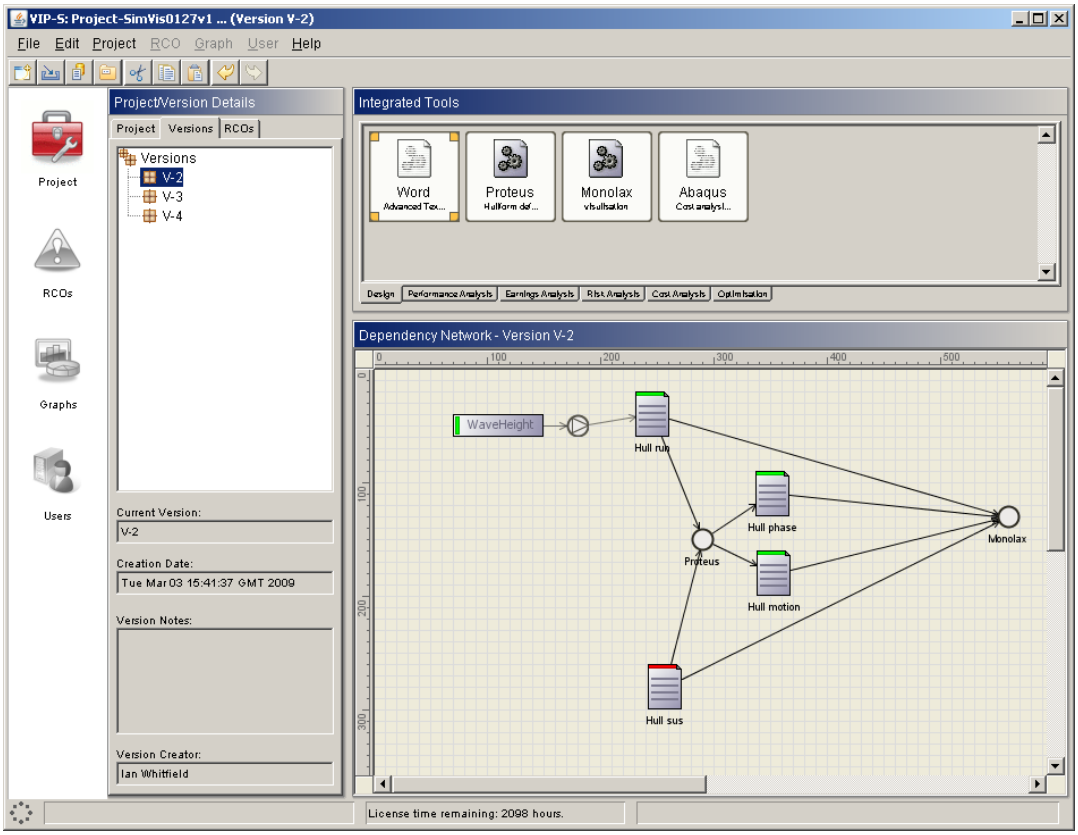


Figure 7-8 Tools integrated

Similarly, integrate other tools in the project network. Figure 7-8 also shows the additional tools integrated into the platform.

> ⚠ *Please note that the users can integrate tools that are available locally on the machine that the user is logged in. In essence, the use of tools within the VIP will be restricted to the users that have bought a license for the tool. This restriction means that other users of the platform do not have access to other partner's tools resolving any licensing issues – users only have access to the tools that they have available to them without the use of the platform.*

7.4 Enacting tools

After integrating tools, the tools should be shown on the list of a menu **Start Tool** like Figure 7-9. You can run one of these tools.

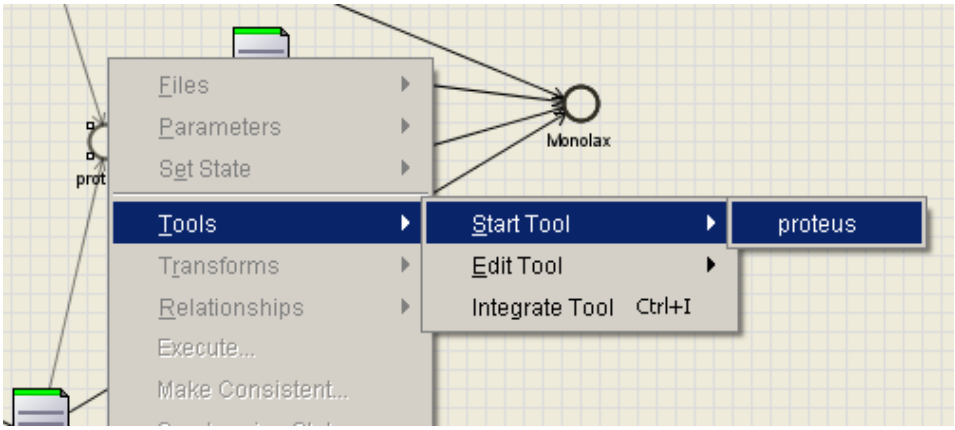


Figure 7-9 Start Tool

7.5 Editing tools

After integrating tools, you can edit tool integration information, such as the path of the executable, arguments, or input files.
Right click the tool node, and click the tool name follow "**Tools** – **Edit Tool**", the tool integration window pop up. Edit the information follow instruction shown in Section 7.3.

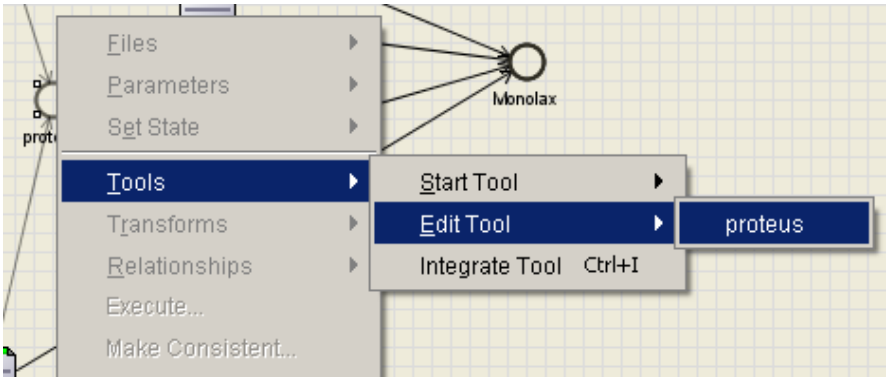


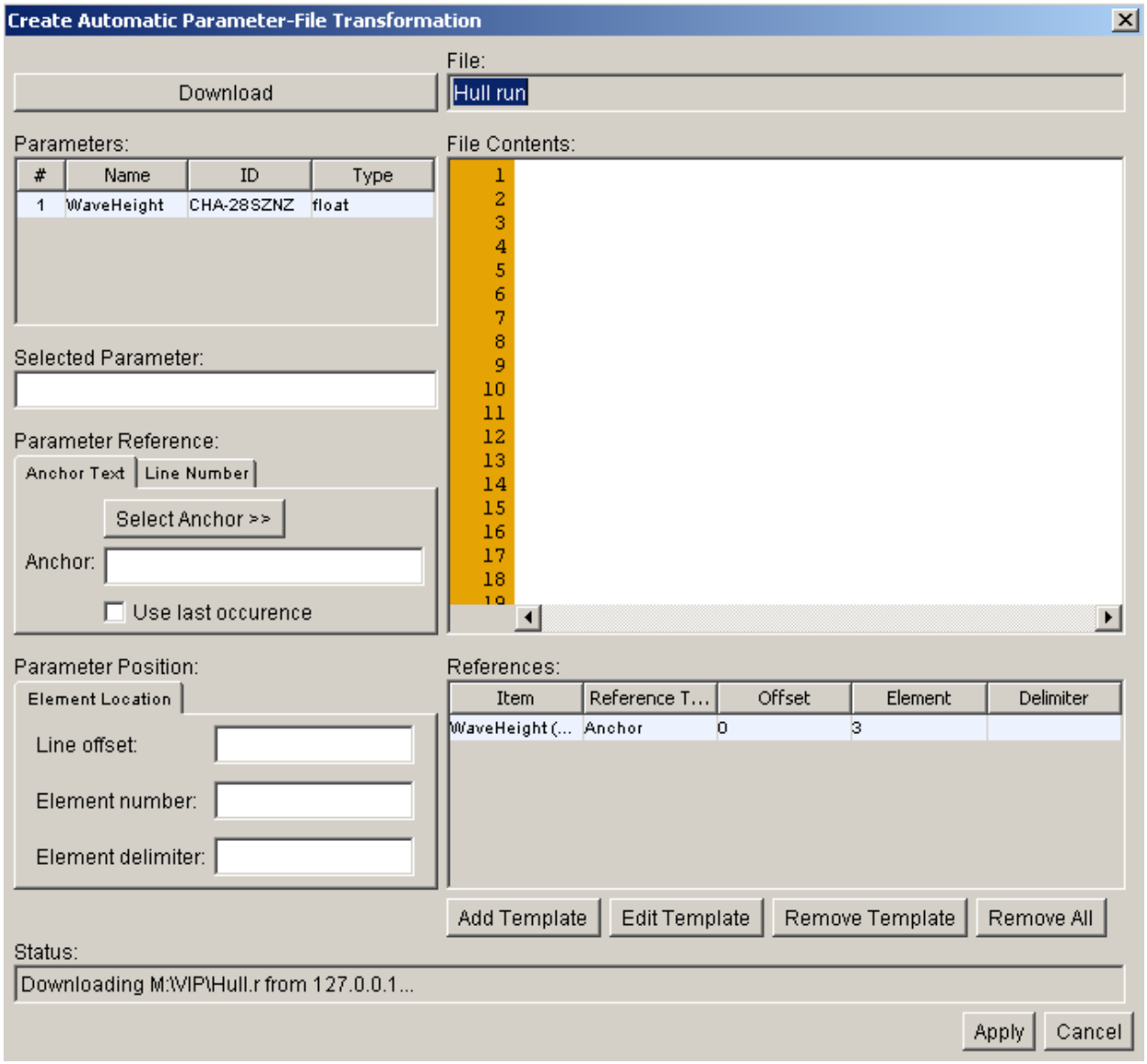
Figure 7-10 Start Tool

8 Configure project - Transforming parameters

There are 2 ways to transform parameters, one is to transform parameters one by one, and the other is to transform a group of parameters using external script. To do so, transforms, files and parameters should be created at the stage of making a dependency network. You can find more information about creating these things in the Sections 5.1.4 Add parameter nodes, 5.1.5 Add transforms and 5.1.6 Add group-transforms.

8.1 Transform one parameter - Insertion

1. Right click the transform needs to be configured, and click **Configure Insertion…**. The **Create Automatic Parameter-File Transformation** window popup.



2. Click **Download** to download the file.

3. Select the parameter that needs to be inserted to the file from the **Parameters** list.

4. The position of the value where the parameter will be put can be set by using an anchor or from the beginning of the document. If using an anchor, select the word in the document, then click **Select Anchor** button.

5. Then input the **Line offset** number to indicate at which line the parameter is.

6. Input the **Element number** to indicate the position of the parameter at the selected line. By default, the VIP uses space as element delimiter. However you can use other delimiter such as comma or semicolon.

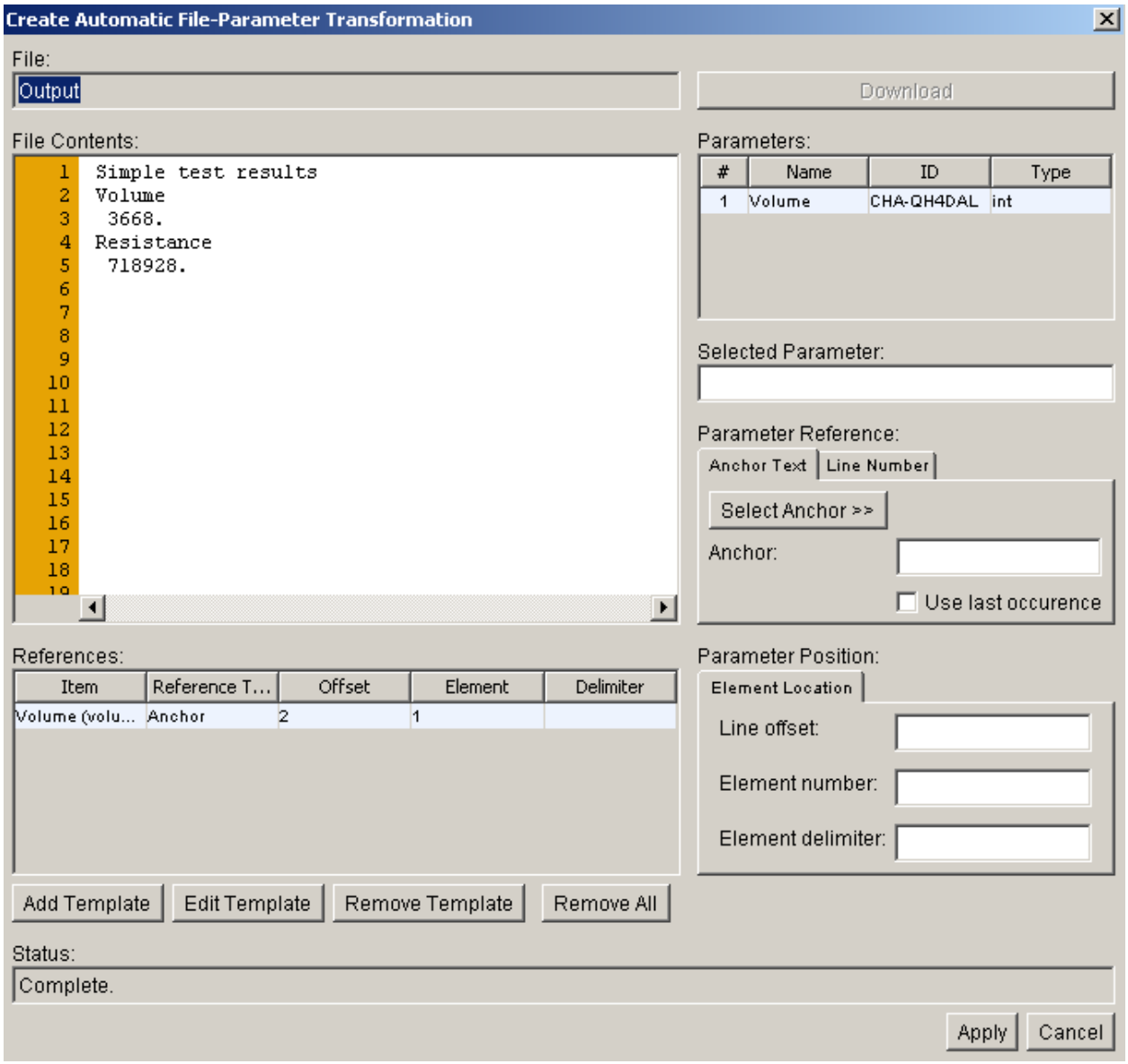
7. Click **Add Template** once the position of the parameter has been selected, to add the parameter insertion to the References list.

8. If there are more parameters to be inserted, repeat steps 3 to 7. Otherwise, click **Apply** to finish transformer configuration.

8.2 Transform one parameter – extraction

Configuring parameter extraction is similar to insertion.

1. Right click the transform needs to be configured, and click **Configure Extraction…**. The **Create Automatic Parameter-File Transformation** window popup.



2. Click **Download** to download the file where the parameter value to be extracted.

3. Select parameter that needs to be extracted from the file from the **Parameters** list.

4. The position of the value where the parameter value will be read can be set by using an anchor or from the beginning of the document. If using an anchor, select the word in the document, then click **Select Anchor** button.

5. Then input the **Line offset** number to indicate at which line the parameter is.

6. Input the **Element number** to indicate the position of the parameter at the selected line. By default, the VIP uses space as element delimiter. However you can use other delimiter such as comma or semicolon.

7. Click **Add Template** once the position of the parameter has been selected, to add the parameter extraction to the References list.

8. If there are more parameters to be extracted, repeat steps 3 to 7. Otherwise, click **Apply** to finish transformer configuration.

8.3 Transform a group of parameters - extraction.

A group-transform is actually a process which is reading a XML file which has parameters in specific format. You can see the format in the chapter 5.1.6 Add group-transforms. So the point is that YOU make a script to produce the XML file. The script should have functionality that can read a data source file and pick up values which you need and write the values in XML format.

1. To run a group-transform, you need to configure the locations where the script file and the XML file is. Select a transform node and right click to open a popup menu and select **TransfomGroup Configuration**.

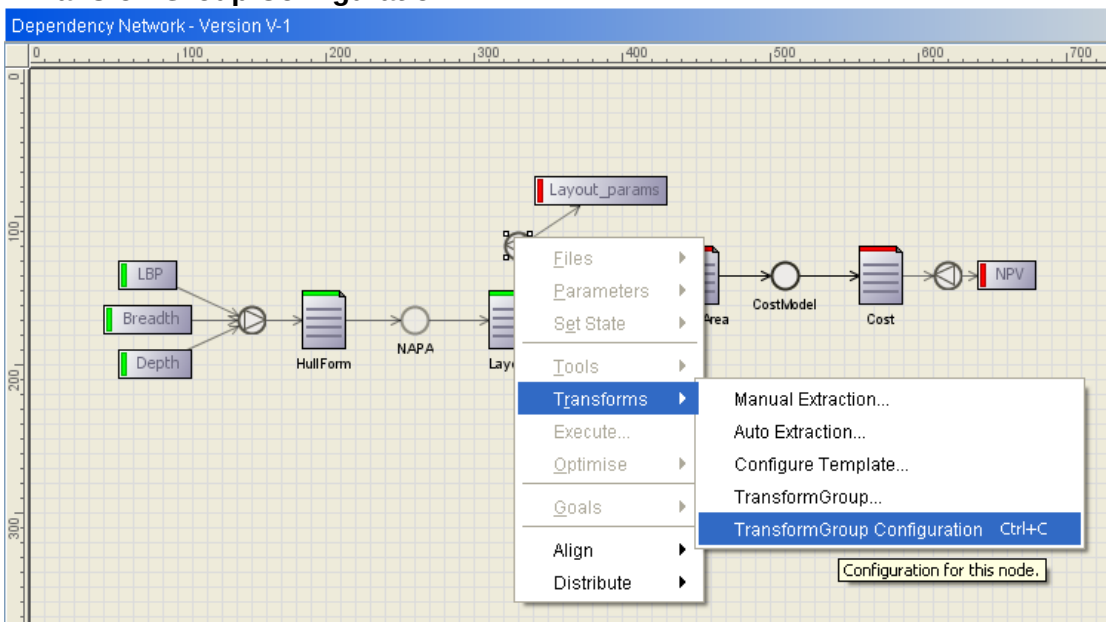


Figure 8-1 Configuration Group-Transform

2. Specify the **Script File** and **Parameter Template File** location using **Browse button.**

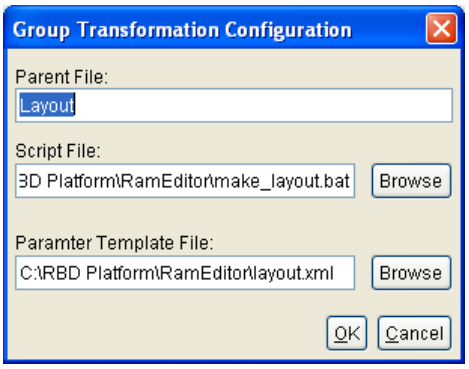


Figure 8-2 Group-Transform Configuration Dialog

3. If once you configure a group-transform, you can run the group-transform using a menu **TransformGroup…**

4. Click a menu **parameters** and **Set Value…** to see the parameters is updated as shown in Figure 8-3. You can change the value of parameters in this dialog.

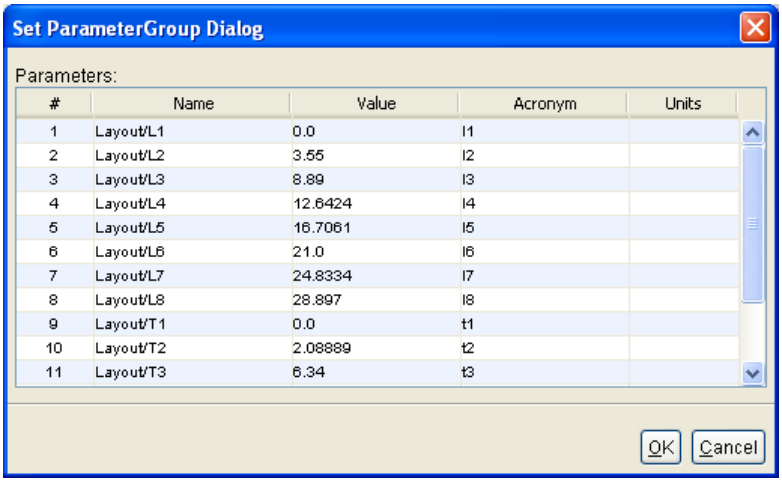


Figure 8-3 View/Set parameters in a group

8.4 Transform a group of parameters - insertion.

The configuration of inserting a group of parameters to a file is similar as configuring extraction.

9 Visualising results

It is important to visualise results in an effective form. The platform provides several forms of graph for the purpose. All graphs can be created using a menu **Graph** as shown in Figure 9-1.

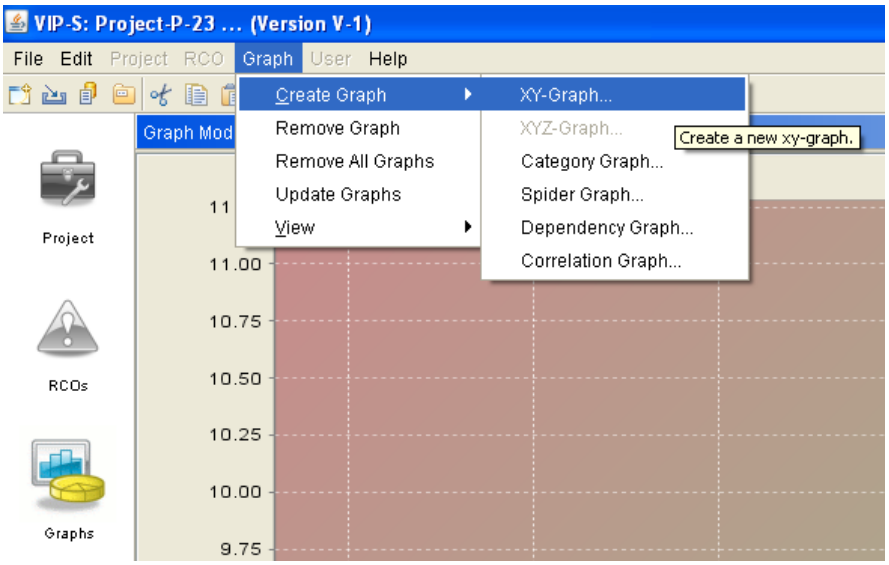


Figure 9-1 Create Graph

9.1 Create XY-graph

A XY-Graph shows all versions in the current project on the 2D-space which user-selected axis make up. An example of XY-Graph is shown in Figure 9-2.

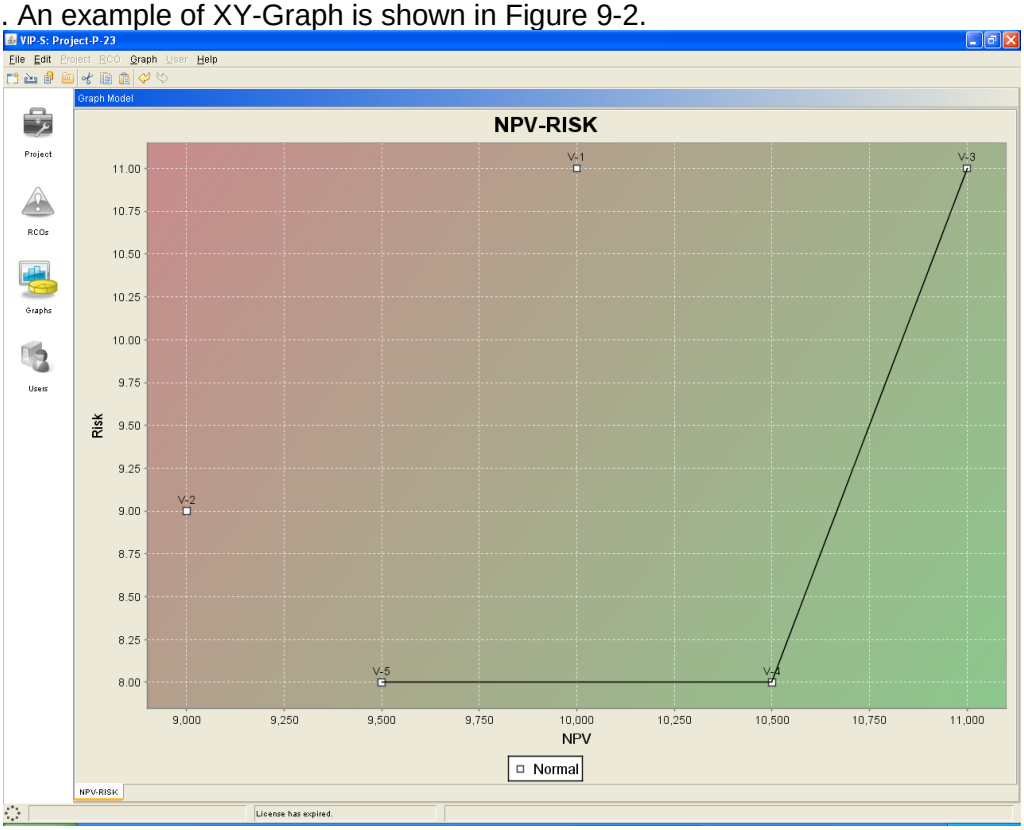


Figure 9-2 XY Graph with Pareto Line

In the **Create XY-Graph Dialog** (Figure 9-2)**,** you can choose a parameter for an axis respectively in the **X-Axis and Y-Axis combo box**. Any parameter published in the project can be an axis. If you put additional information about preferring direction of the parameter using **Optimum X Value and Y Value combo box**, you can see a Pareto Front Line according to the preferring direction as shown in Figure 9-2.

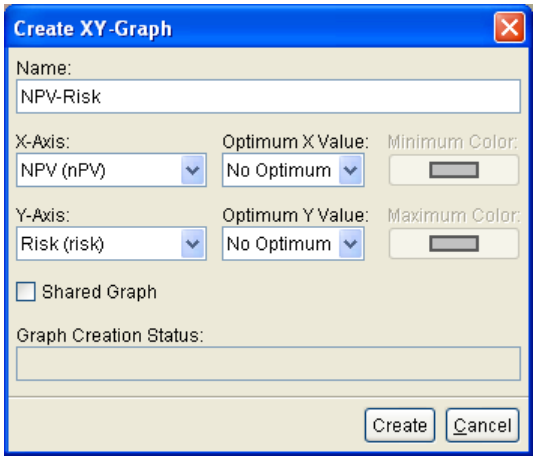


Figure 9-3 Create XY Graph

When you create new version, you make it based on the best version by that time, and you might expect the new one should be better. However, which parameters and how much should we change to get the better one?

A XY-Graph can give you a good idea of the direction to change values of parameter. Just right-click a version point to be the base point for creating the next version, and click again a menu **Show Effectiveness** on the pop-up menu as shown in Figure 9-4.

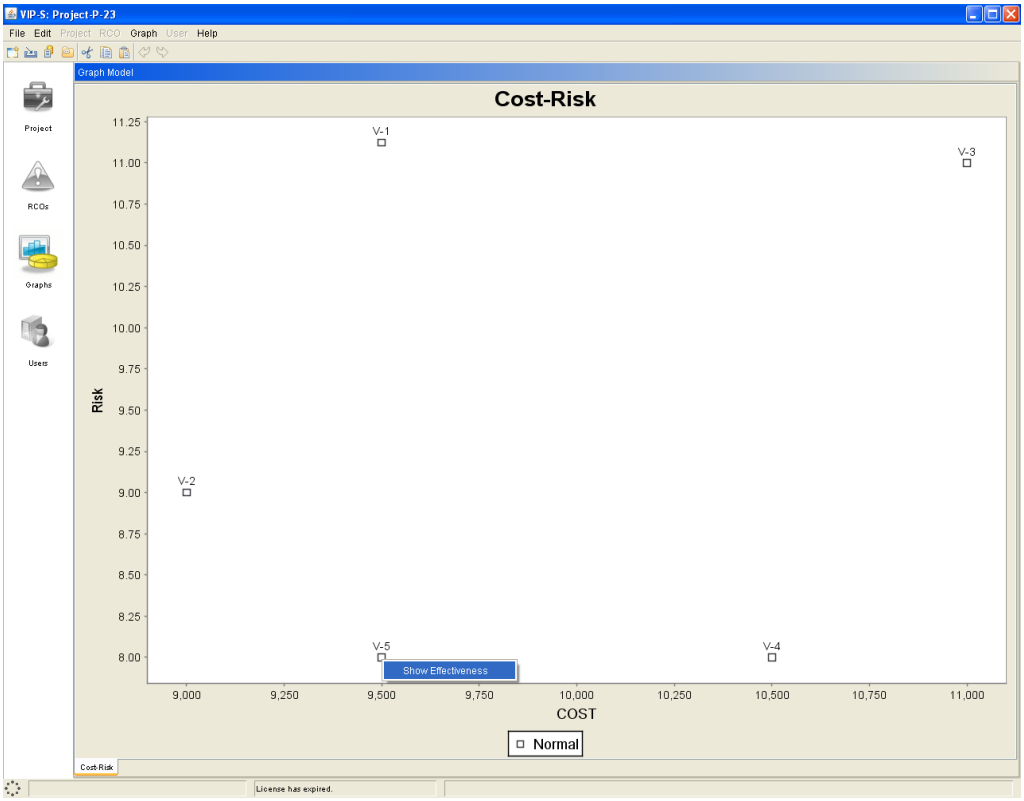


Figure 9-4 Show Effectiveness

Figure 9-5 is a picture which shows effectiveness calculated based on version 5 point.

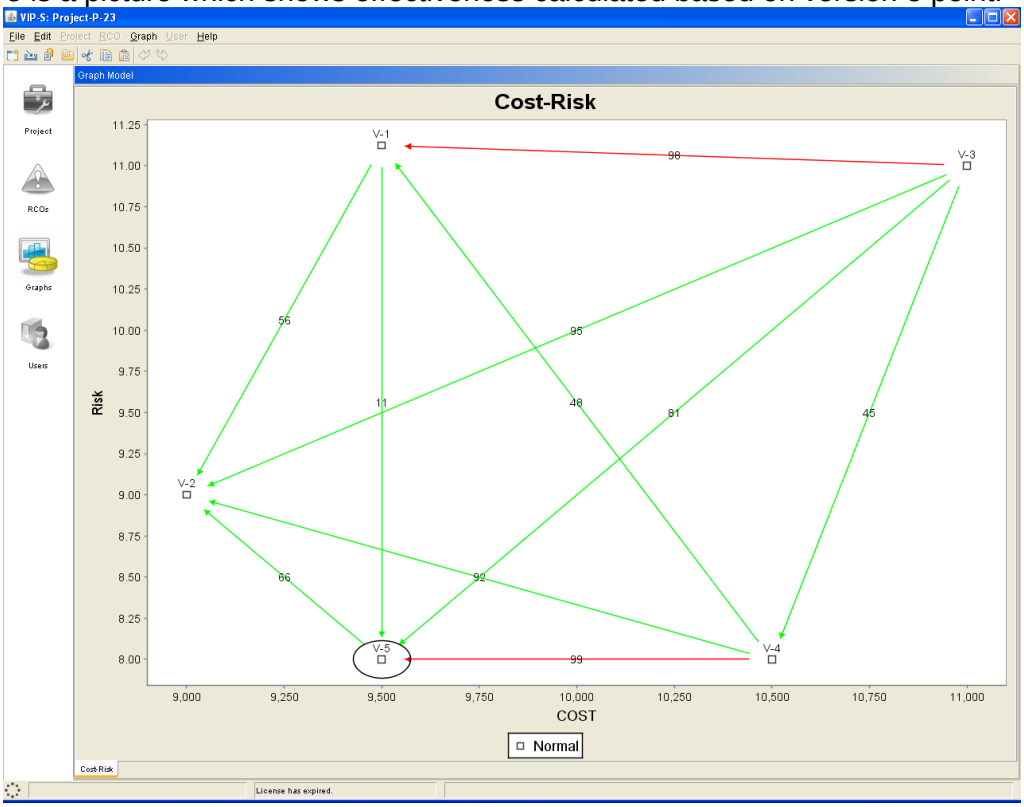


Figure 9-5 Effectiveness Arrows

The arrows of effectiveness are made in this way. In the XY-Graph, a difference between each version can be regarded as a vector which has two elements. For this case of cost and risk, the elements are respectively cost and risk. The cost-risk vector is a result of changing other parameters as much as a difference between two versions (For reference, see Figure 9-7 showing the difference of all parameters). Let's say that the cost and risk is an output parameter of the vector, and the other is an input parameter of the vector and there are three version named V1, V2 and V3.

We can reasonably assume that if we change input parameters of V3 as much as difference of input parameters between V1 and V2, we get a new version V4 which might have cost and risk changed as much as output parameters of the vector V2-V1.

In the context of cost and risk, the lower value of the parameter is going, the better the version is. In the reason, a vector which is from a base version to left-bottom corner is the most effective vector. The colour and number on the arrow means that how much its direction is close to the most effective one. The number is in the range from 0 to 100 as it is getting effective, the arrows which have value more than 96 is in red.

Figure 9-5 are two most effective arrows in red. You can use one of them as reference direction to create next better version.

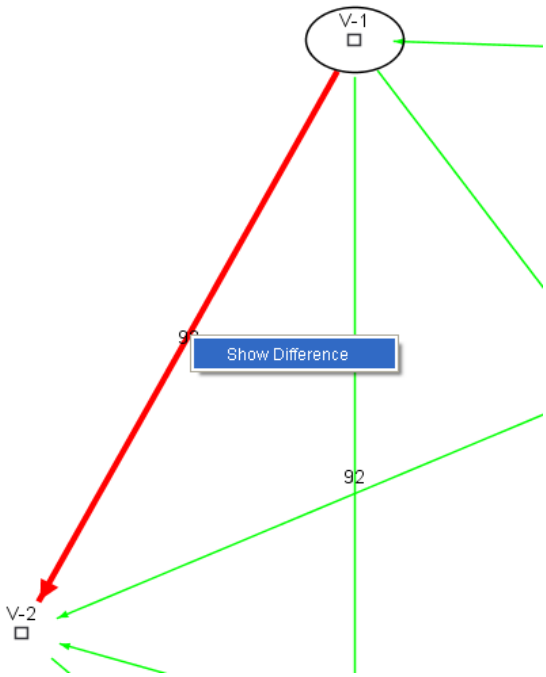


Figure 9-6 Show difference

When you right-click an arrow and select the menu **Show Difference** as shown in Figure 9-6, you can see differences of all parameters of two versions which make the vector as shown in Figure 9-7.

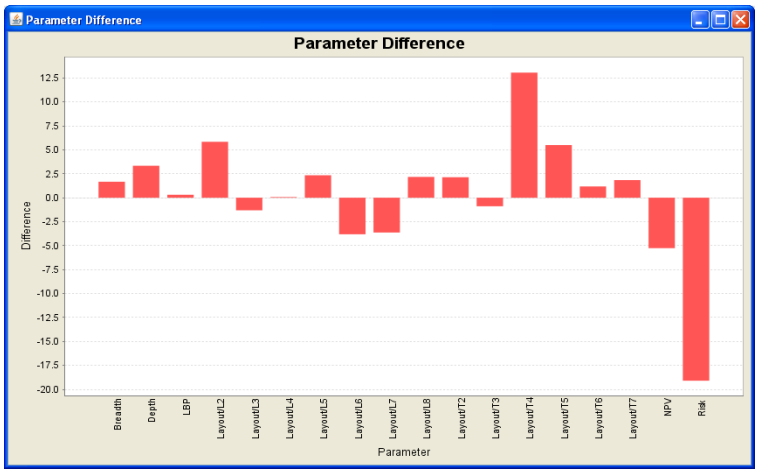


Figure 9-7 Difference between two versions

9.2 Create category graph

A Category-Graph shows all versions in the current project in a way that a value of parameter is normalised with a maximum and minimum of parameter values of all versions with respect to each every parameter. Designer can see a relative variation of a value of parameters. An example of Category-Graph is shown in Figure 9-8.

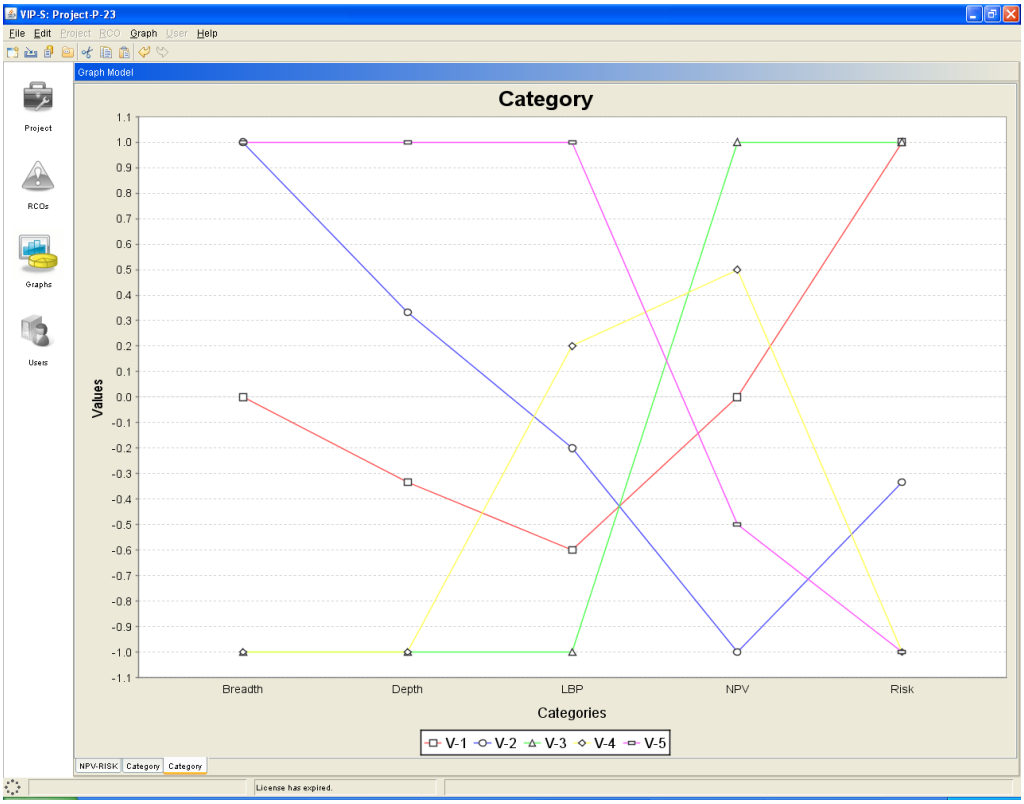


Figure 9-8 Category Graph

In the **Create Category-Graph Dialog** (Figure 9-9)**,** you can choose parameters only to be shown using the **parameters list box**.

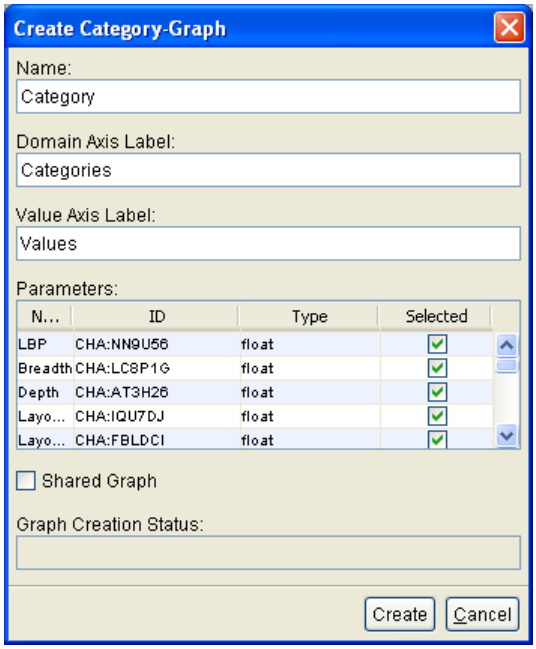


Figure 9-9 Create Category Graph

9.3 Create spider graph

A Spider-Graph is similar to a Spider-Graph but it is different in the sense that it shows in form of circular axis. An example of Spider-Graph is shown in Figure 9-10 Spider Graph.

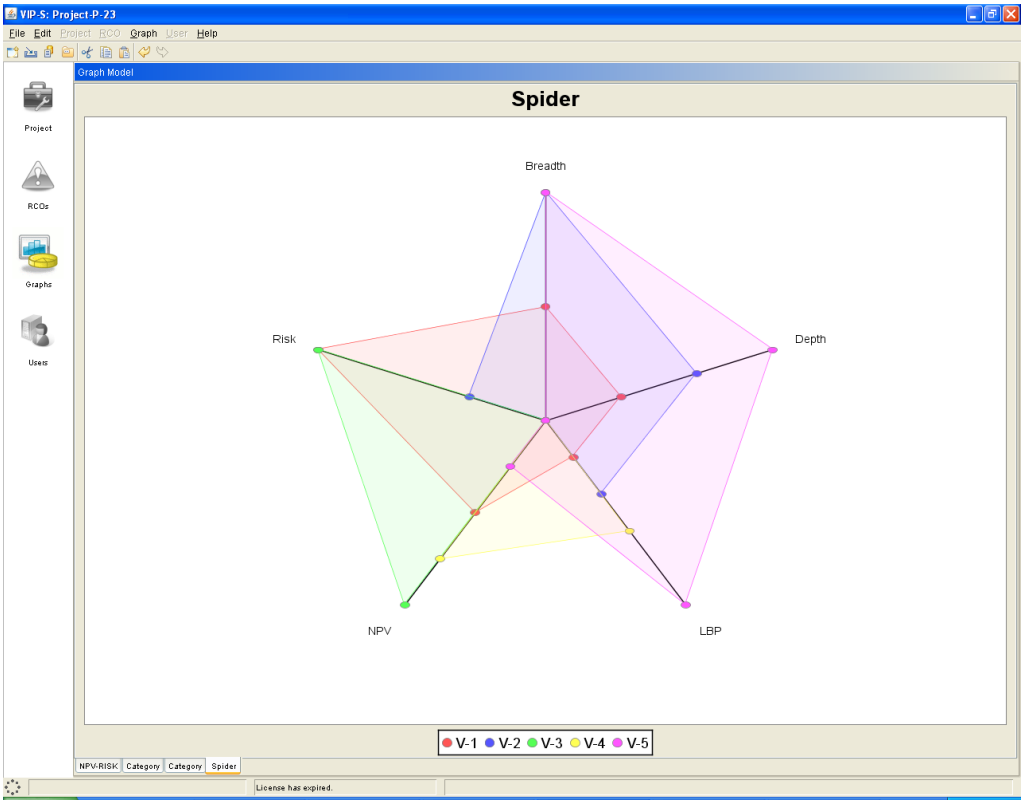


Figure 9-10 Spider Graph

In the **Create Spider-Graph Dialog** (Figure 9-11)**,** you can choose parameters only to be shown using the **parameters list box**.

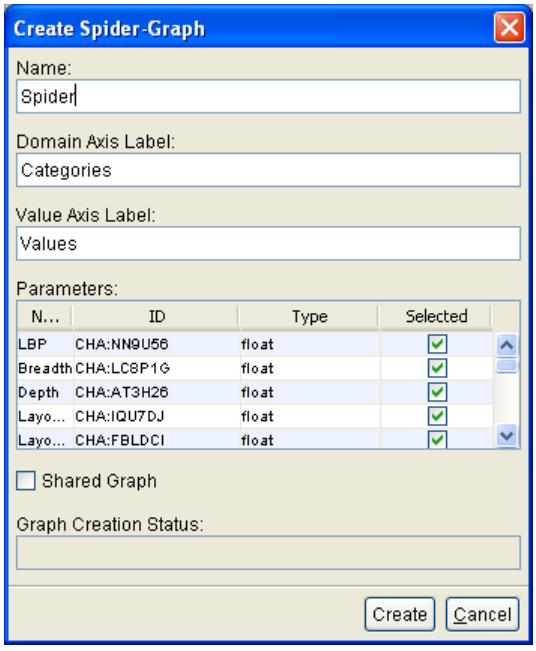


Figure 9-11 Create Spider Graph

9.4 Create dependency graph

A Dependency-Graph shows values of all parameters of a current version in a tree form representing dependency between every file and parameters. This graph enables a designer to find out that which parameters have an effect on other parameters. Each folder node in the tree

represents a file item of the dependency network and a document node that belongs to the folder represents a parameter.

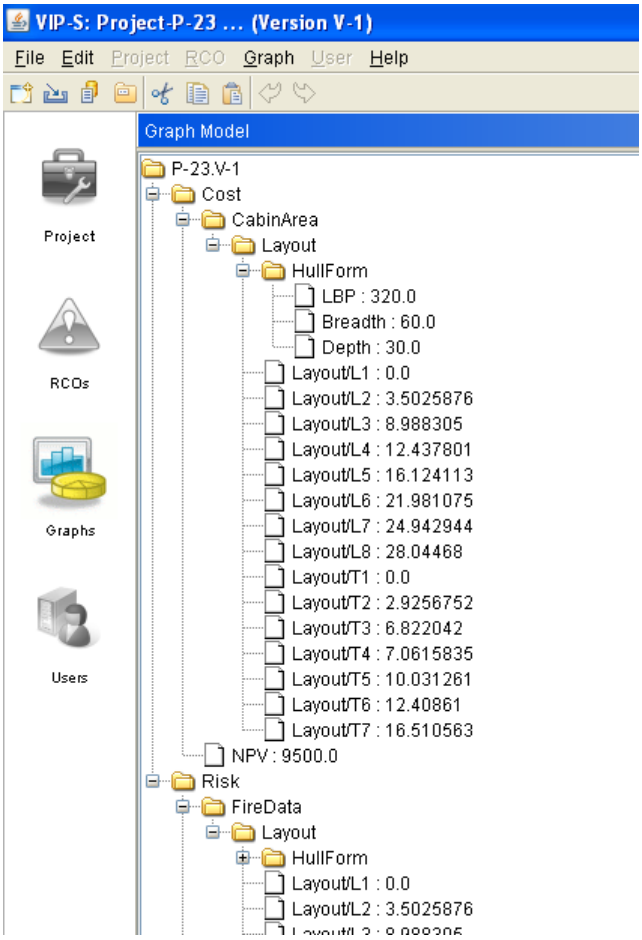


Figure 9-12 Dependency Graph

9.5 Create correlation graph

A Correlation-Graph shows a Pearson's product-moment coefficient which is a common measure of the correlation between two variables X and Y. A designer is able to know the strength and direction of a linear relationship between two variables from this value. For examples, value 1 means (a cell in red) that the 2 parameters has a strong positive relationship, so one is going up as the other is going up, and value -1 means (a cell in green) that the 2 parameters has a strong negative relationship, so one is going down as the other is going up. A cell in yellow means there is no linear relationship. With the information, when a value of a parameter is changed, a designer might be able to assume how other parameter should be moving.

⚠ *If values of a parameter across all versions, the coefficient can not be calculated and displayed as NaN.*

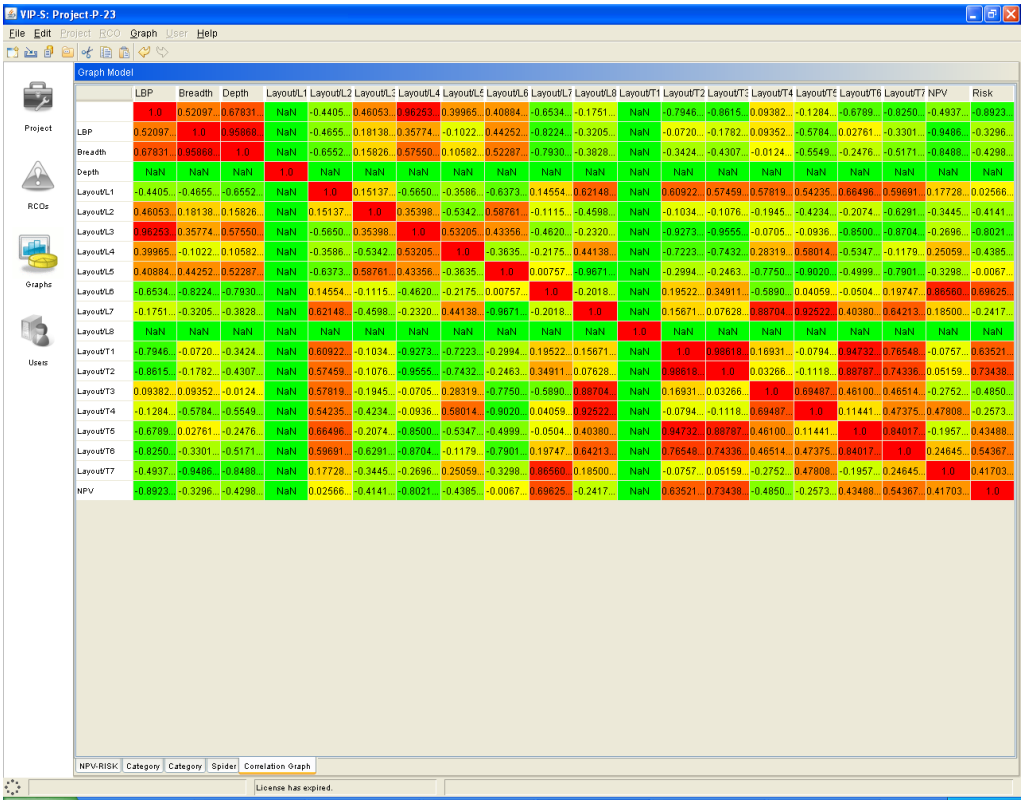


Figure 9-13 Correlation Graph

10Managing projects

After a project has been created, to open, archive, or delete an existing project can be done through manage projects window.

To manage projects, click **Manage Projects** button from the **File** menu in the VIP (see Figure 10-1). The **Project Management Dialogue** window will appear as shown in Figure 10-2.

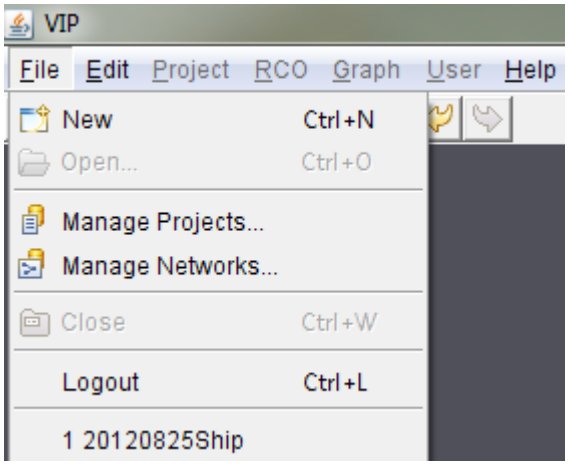


Figure 10-1 Manage projects button

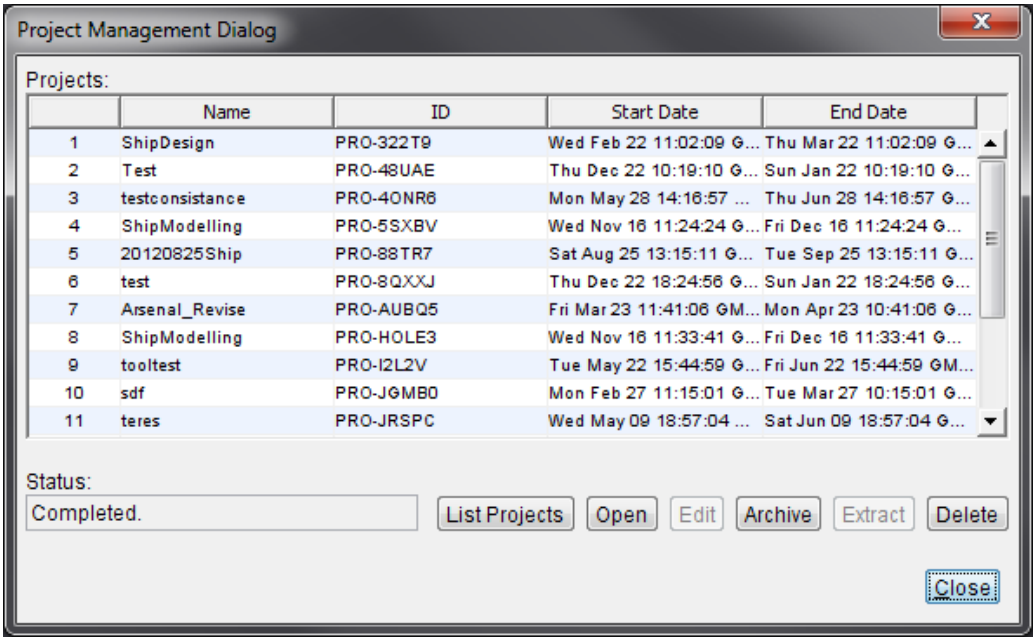

Project Management Dialog
Projects:
Name
ID
Start Date
End Date
1 ShipDesign PRO-322T9 Wed Feb 22 11:02:09 G... Thu Mar 22 11:02:09 G...
2 Test PRO-48UAE Thu Dec 22 10:19:10 G... Sun Jan 22 10:19:10 G...
3 testconsistance PRO-4ONR6 Mon May 28 14:16:57 ... Thu Jun 28 14:16:57 G...
4 ShipModelling PRO-5SXBV Wed Nov 16 11:24:24 G... Fri Dec 16 11:24:24 G...
5 20120825Ship PRO-88TR7 Sat Aug 25 13:15:11 G... Tue Sep 25 13:15:11 G...
6 test PRO-8QXXJ Thu Dec 22 18:24:56 G... Sun Jan 22 18:24:56 G...
7 Arsenal_Revise PRO-AUBQ5 Fri Mar 23 11:41:06 GM... Mon Apr 23 10:41:06 G...
8 ShipModelling PRO-HOLE3 Wed Nov 16 11:33:41 G... Fri Dec 16 11:33:41 G...
9 tooltest PRO-I2L2V Tue May 22 15:44:59 G... Fri Jun 22 15:44:59 GM...
10 sdf PRO-J6MB0 Mon Feb 27 11:15:01 G... Tue Mar 27 10:15:01 G...
11 teres PRO-JRSPC Wed May 09 18:57:04 ... Sat Jun 09 18:57:04 G...
Status:
Completed.
List Projects
Open
Edit
Archive
Extract
Delete
Close

Figure 10-2 Project Management

10.1 Open projects

To open a project:

1. Select **Manage Projects** from File menu and the **Project Management Dialogue** window pop up.
2. A list of projects created will be displayed as shown in Figure 10-2. Select the project you would like to open.
3. Click **Open** to open the project.

10.2 Managing project versions

10.2.1 Select project versions

1. Click the **Versions** tab in the **Project/Versions** panel. A list of versions created for that particular project will be displayed as shown in Figure 10-3.

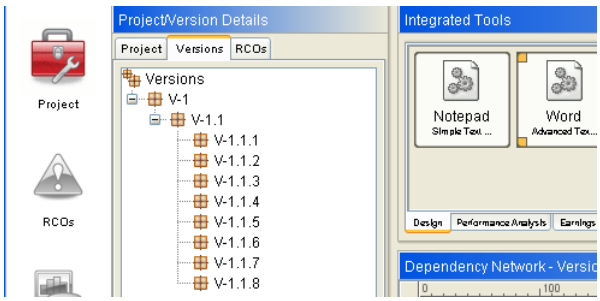


Figure 10-3 Project version

2. Double click the version that you would like to work one will open the version. Or, you can right click a version. A list of options will be displayed as shown in Figure 10-4.

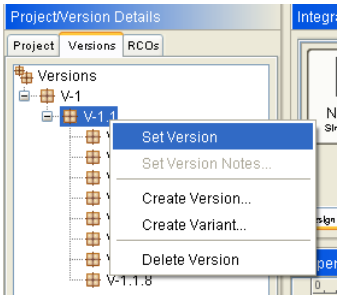


Figure 10-4 Select version

3. Click **Set Version**, the VIP will work on the version has been selected.

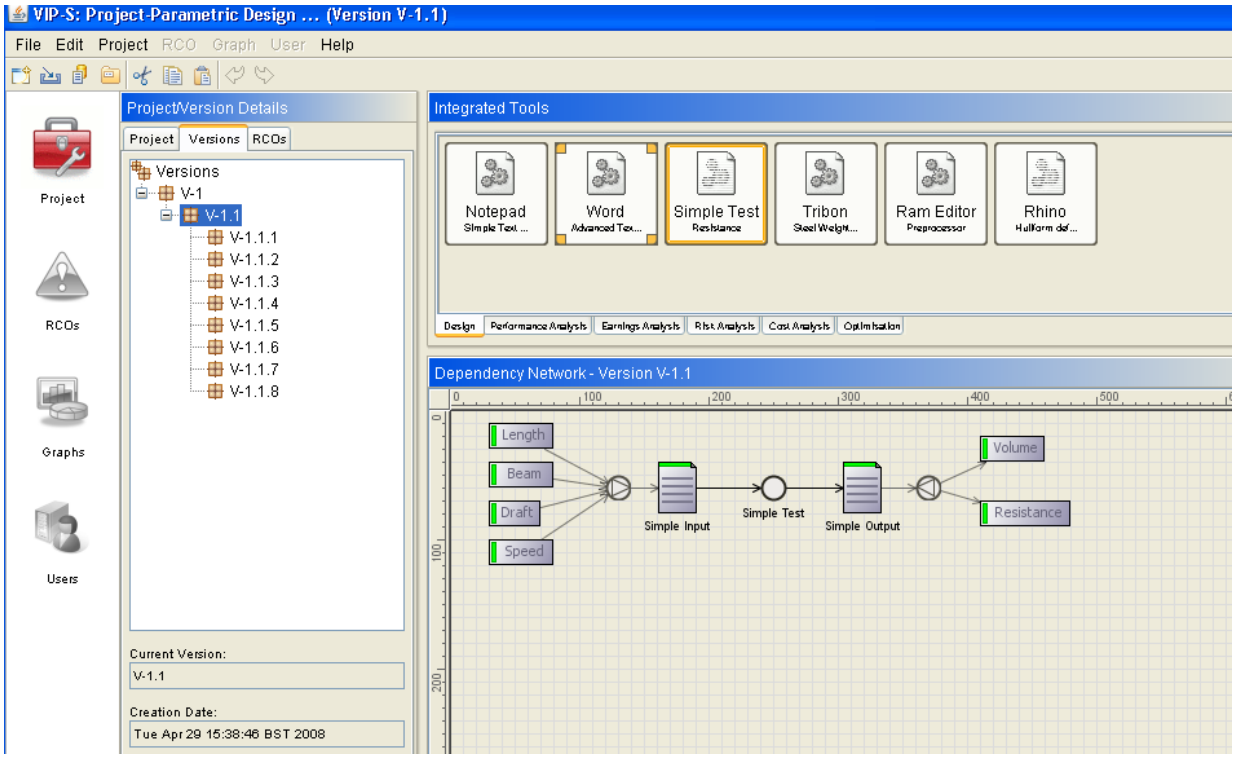


Figure 10-5 Set version for a project

10.2.2 Create a new version

If the user's preference is to create a new version:

1. Click **Create Version** (see Figure 10-6). A **New Version Creation Wizard** to input version details will be displayed as shown on Figure 10-7.

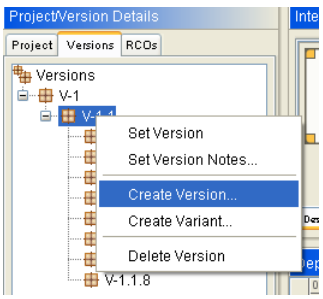


Figure 10-6 Create new version

2. Input **Version notes**, if required, in the **New Version Creation Wizard-step 1 of 2-version details** window and click **Next** button to proceed to next stage (see Figure 10-8).

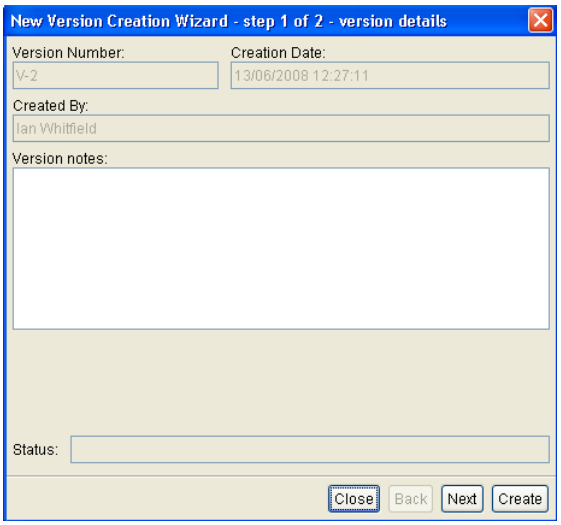


Figure 10-7 New Version Creation Wizard- version details

3. Add any preliminary data in the **New Version Creation Wizard-step 2 of 2-preliminary data** window (see Section **Error! Reference source not found.** on how to add preliminary data) and click **Create** button to create a new version of the project.

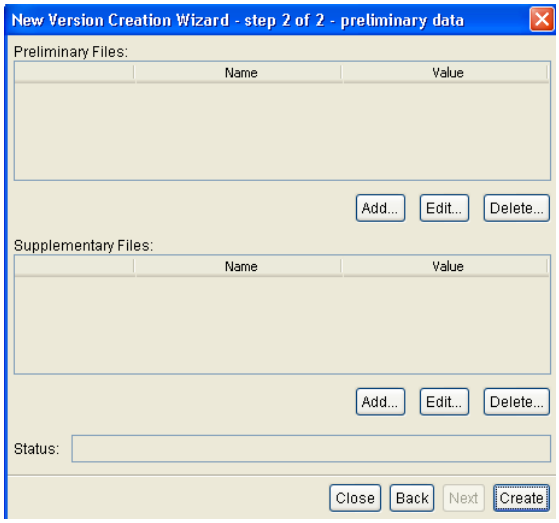


Figure 10-8 New Version Creation Wizard- preliminary data

4. Next, click **Close** button to close the **New Version Creation Wizard-step 2 of 2-preliminary data** window. The created version will be added to the list of existing versions of the project (see Figure 10-9).

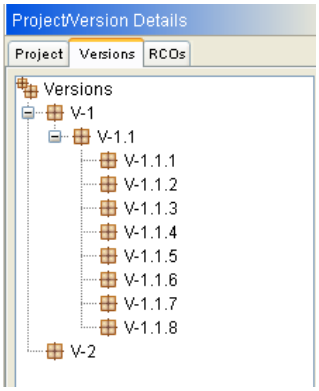


Figure 10-9 Creation of new version

10.2.3 Delete project versions

If the user's preference is to delete a project version:

1. Click **Delete Version** (see Figure 10-10) after selecting the version to be deleted. A confirmation message for the deletion will be displayed as shown in Figure 10-11.

2. Click **Yes** button to delete the version. The version will be removed from the version hierarchy in the **Versions** panel and permanently deleted from the database.

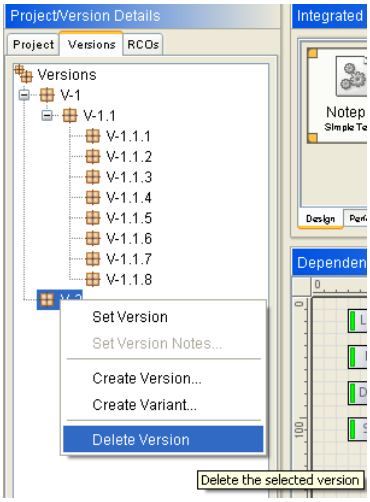


Figure 10-10 Delete version

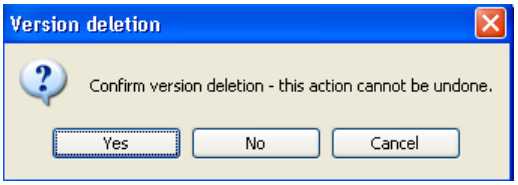


Figure 10-11 Version deletion

10.3 Delete projects

To delete project (s):

1. Select **Manage Projects** from File menu and the **Project Management Dialogue** window pop up, and a list of projects created will be displayed as shown in Figure 10-2.
2. Select the project you would like to delete.

3. Click **Delete** button in the **Project Management Dialogue**.

4. Click **Yes** button to confirm the deletion (see Figure 10-12).

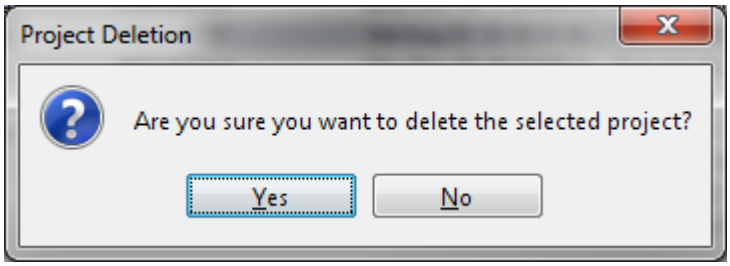


Figure 10-12 Project deletion confirmation

10.4 Edit projects

To edit project (s):

1. Connect to the database to retrieve the projects created (see Section 10.1 Download method 2).

2. Select a project from the displayed list by clicking on the appropriate project process to be edited (see **Error! Reference source not found.**).

3. Click **Open** button in the **Project Management Dialogue**. The associated information of the selected project is downloaded and populated within the VIP GUI as shown in **Error! Reference source not found.**.

4. Click **Close** button in the **Project Management Dialogue** once the selected project is opened.

5. To edit a specific version of the selected project, please see Section 10.2.

6. To create a new version for the selected project, please see Section 10.2.2.

7. To delete a version for the selected project, please see Section 10.2.3.

11 Managing networks

You can edit an available network, derive a network based on an available network, delete a network from Network Management Dialog. Open the dialog from **Manage Networks…** in the **File** menu.

> *You can also manage network during the process of creating a project in Project Creation Wizard – step 2 of 4 – network details window (Figure 6-3).*

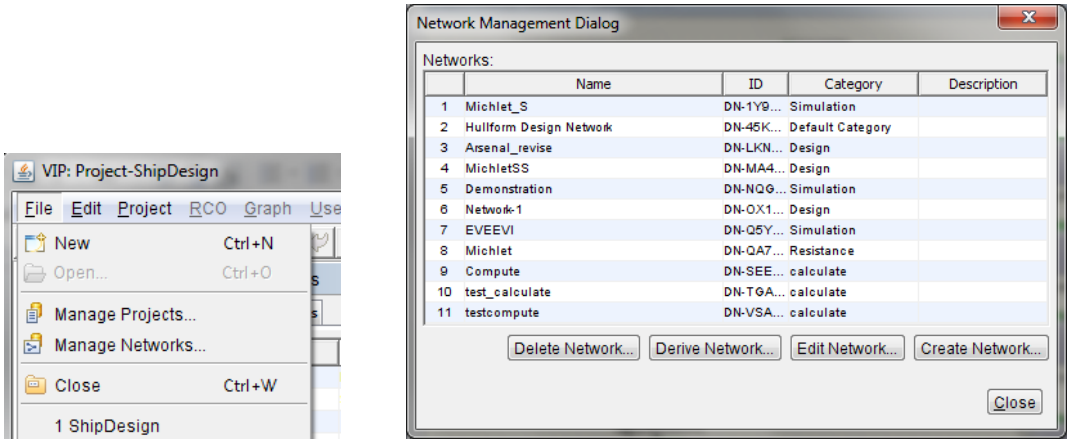


Figure 11-1 Managing network

To delete a network, select the network, and click **Delete Network**.

To edit a network, select the network you want to edit, then click **Edit Network**. In the Network Editor, edit the network. Refer to Section 5 for instruction.

To derive a network, select the network that the new network will be based on, then click **Derive Network**. Input the name of the new network, and edit the network in the Network Editor. Refer to Section 5 for instruction.

12Launching VIP optimisation

The optimisation within the VIP has been designed for general purpose. In this section, a project named “Parametric Design” is used as an example of how to configure the VIP for optimisation.

1. Right click on the data dependency network for the version of the data being selected within the VIP GUI. A list of options will be displayed as shown in Figure 12-1.

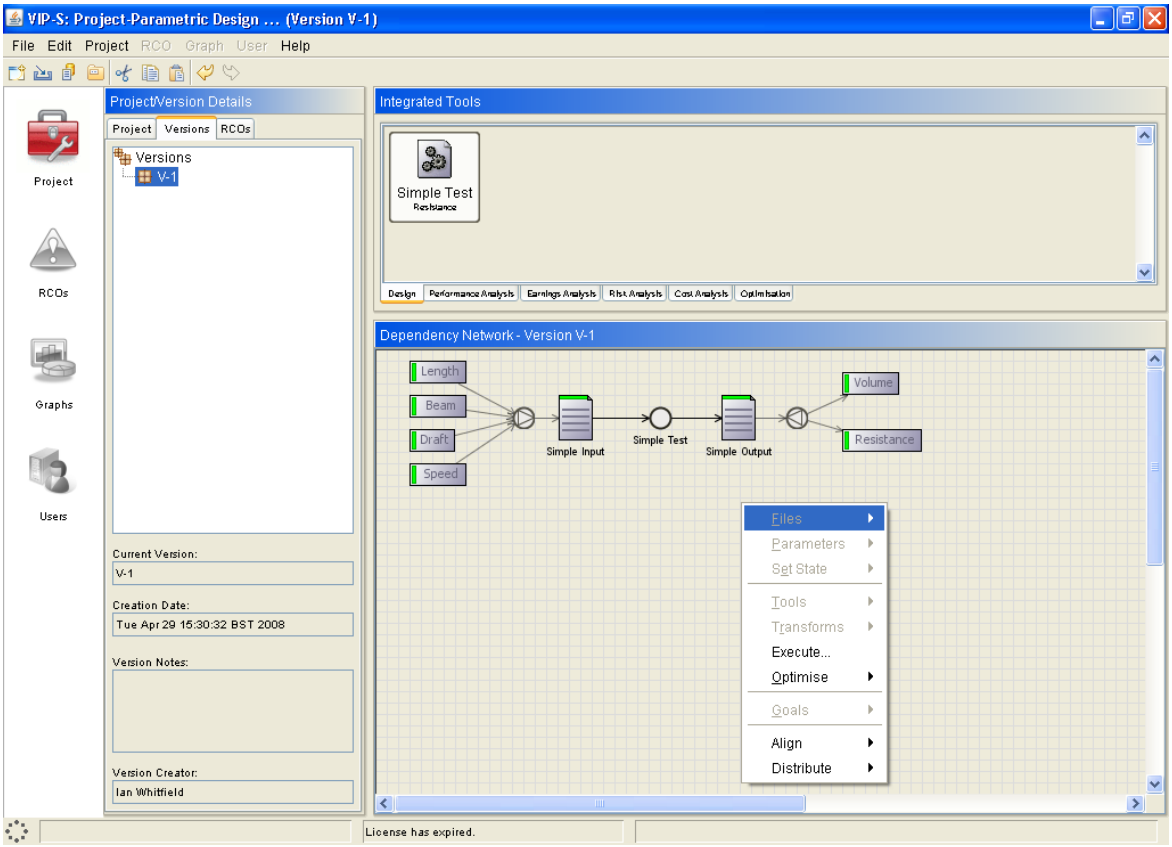


Figure 12-1 Optimisation selection

2. Select the **Optimise** menu. A list of options to configure optimisation will be displayed as shown in Figure 12-2.

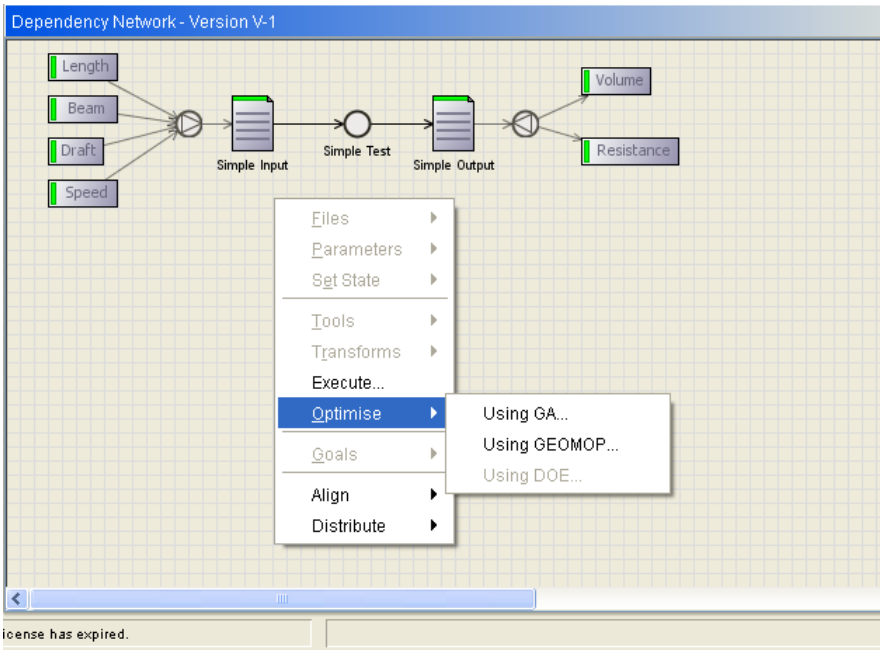


Figure 12-2 Optimisation using GA

Selecting **Using GA** (Generic Algorithm) option will invoke the **GA Optimisation Dialog** as shown in Figure 12-3.

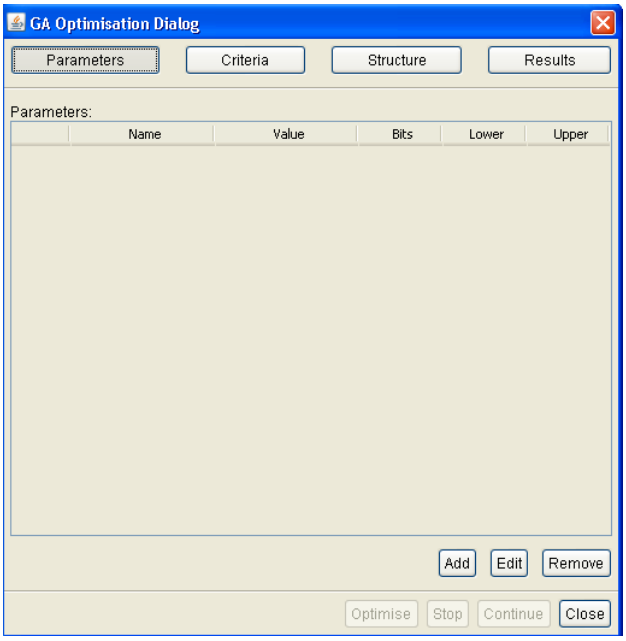


Figure 12-3 GA Optimisation Dialog

The **GA Optimisation Dialog** window is divided into four sections: **Parameters**, **Criteria**, **Structure** and **Results**.

12.1 Add parameters

To add parameter (s):

1. Click **Parameters** button in the **GA Optimisation Dialog.** Selecting this option will invoke the **Parameter** table (see Figure 12-3), which will present a list of all the parameters subsequently.

2. Click **Add** button in the **Parameter** table of **GA Optimisation Dialog** to provide input values to the parameters used in the optimisation. An **Add Optimisation Parameter Dialog** as shown in Figure 12-4 will be displayed.

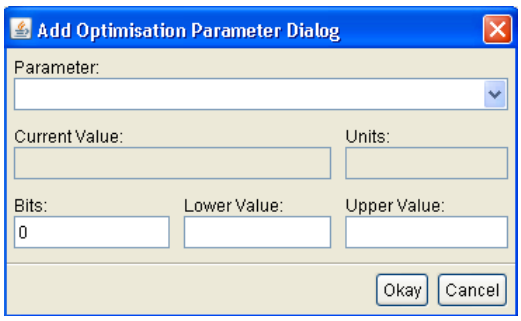


Figure 12-4 Add Optimisation Parameter Dialog

3. Select the parameter from the drop down menu of the **Parameter** field to which the input value needs to be added as shown in Figure 12-5. Provide the lower and upper values for the parameter in the **Lower Value** and **Upper Value** fields.

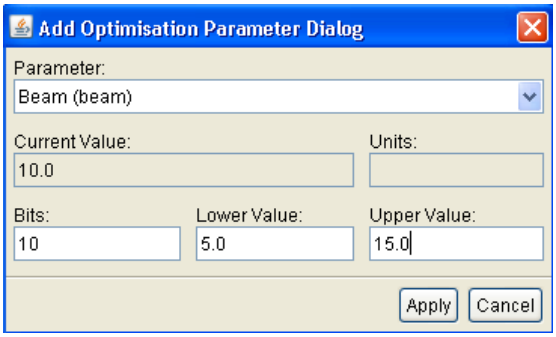


Figure 12-5 Add input values to parameters

4. Click **Apply** button in the **Add Optimisation Parameter Dialog** to add the parameter.

   The parameter with the defined values will be added to the **Parameter** table of the **GA Optimisation dialog** as shown in Figure 12-6.

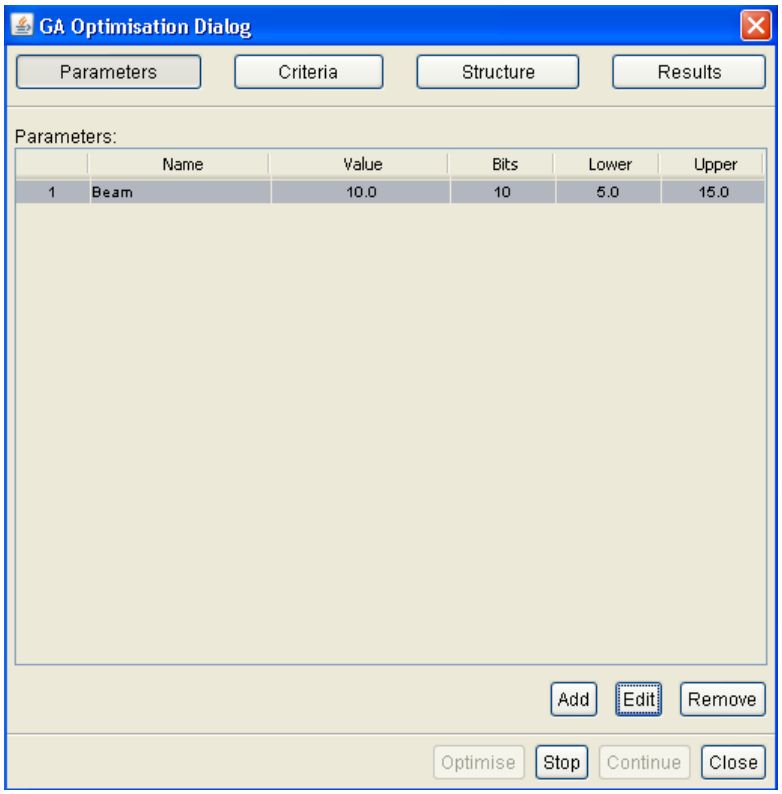


Figure 12-6 An example of a parameter added to the parameter table in the GA Optimisation

5. Follow steps 1 to 4 to add other parameters to the GA Optimisation. The parameters will be added to the other parameters in the **Parameter** table of the **GA Optimisation Dialog** (see Figure 12-7).

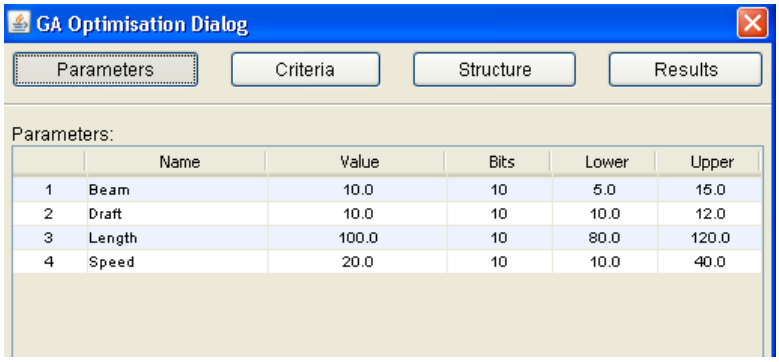


Figure 12-7 A sequenced list of parameters added to the GA Optimisation

12.2 Add criteria

To add criterion:

1. Click **Criteria** button in the **GA Optimisation Dialog.** Selecting this option will invoke the **Criteria** table, which will present a list of criteria subsequently.

2. Click **Add** button in the **Criteria** table of **GA Optimisation Dialog** to provide criteria to be used during optimisation. An **Add Criterion Dialog** as shown in Figure 12-8 will be displayed.

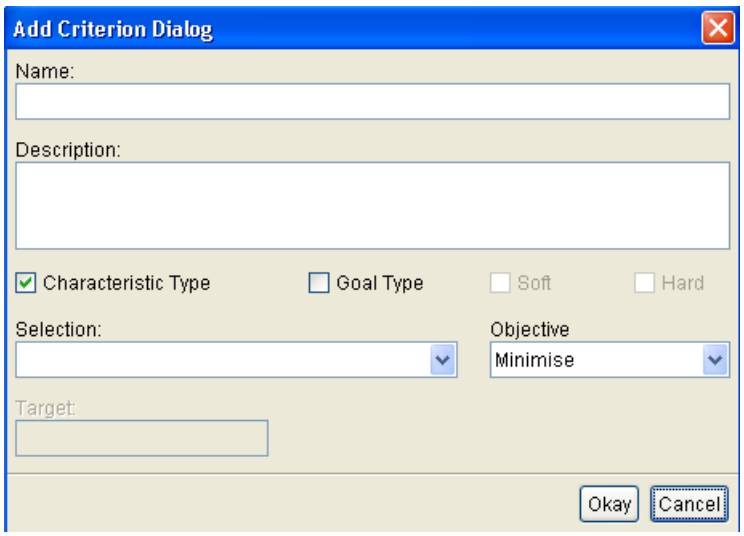


Figure 12-8 Add Criterion Dialog

3. Select the criteria and its corresponding objective from the **Selection** and **Objective** fields respectively as shown in Figure 12-9.

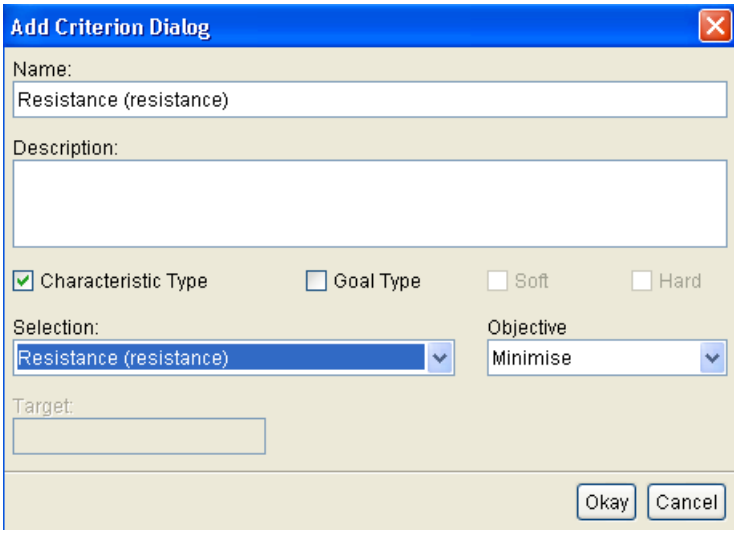


Figure 12-9 An example of criteria selection

4. Click **Okay** button in the **Add Criterion Dialog** to add the criteria. The criteria with the defined values will be added to the **Criteria** table of the **GA Optimisation dialog.**

5. Follow steps 1 to 4 to add other criteria to the GA Optimisation. The criteria will be added to the **Criteria** table of the **GA Optimisation Dialog** as shown in Figure 12-10.

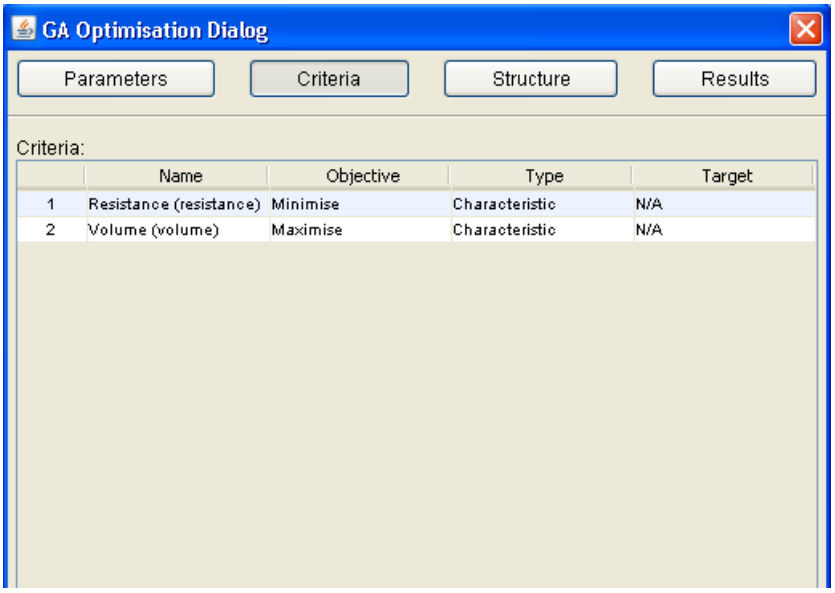


Figure 12-10 A sequenced list of criterion added to the GA Optimisation

12.3 Add structure

1. Click **Structure** button in the **GA Optimisation Dialog.**

2. Input values in the **Population Size** and **Generation Count** fields as shown in Figure 12-11**.** For instance, as shown in Figure 12-11, the values given for **Population Size** and **Generation Count** are 4 respectively. This implies that 4X 4 = 16 iterations will take place.

3. Check the **Create version for each concept** box, to create versions for each of the concepts generated.

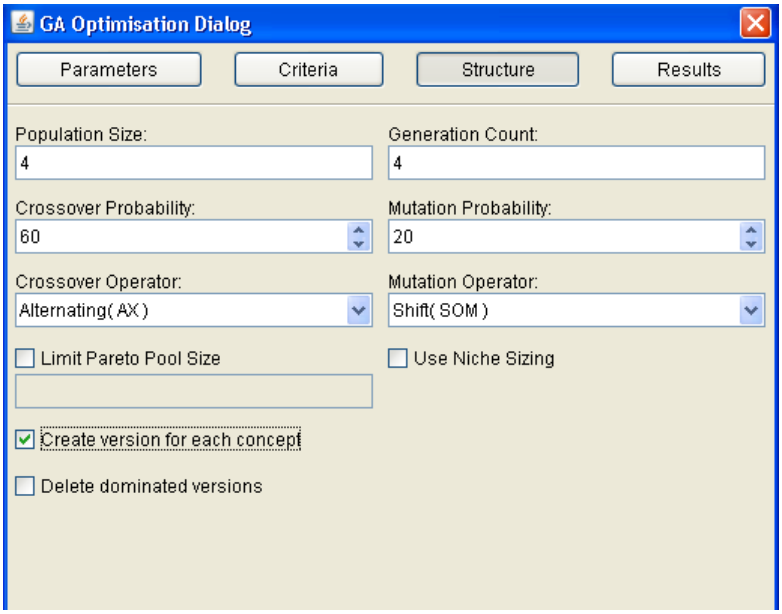


Figure 12-11 Add structure

12.4 View results

To view results

1. Click **Results** button in the **GA Optimisation Dialog.** Selecting this option will invoke the **Results** dialog with the **GA Optimisation Dialog** as shown in Figure 12-12.

2. Check **Update Design** button in the **Results** dialog as shown in Figure 12-12 to update design on creation of each concept.

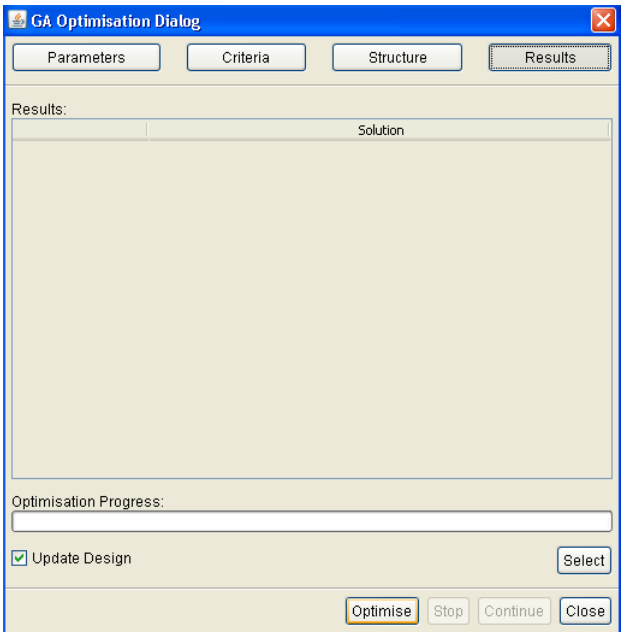


Figure 12-12 View results

12.5 Launch optimisation

The optimisation process can be considered as a 'workflow' constructed by the actions for generation, calculation and production of new concepts to get a near optimal solution.

Start the optimisation process by clicking the **Optimise** button. The optimisation process will start by:

1. Displaying the progress in the **Optimisation Progress** field of the **Results** dialog within the **GA Optimisation Dialog** as shown in Figure 12-13.
2. Displaying the additional details of each of the actions as they are being executed in the **Actions** window of the **Console** dialogue as shown in Figure 12-13.

   ⚠ *The Console window displays any standard input/output that the tool may produce and actions as they are being executed.*

3. Creating the versions for each concept generated in the **Versions** section of the **Project/Versions Details** panel as shown in Figure 12-14.

   ⚠ *Please note that during the optimisation progress, the process can be paused by clicking the **Stop** button in the **GA Optimisation Dialog**. To resume the optimisation process, click the **Continue** button.*

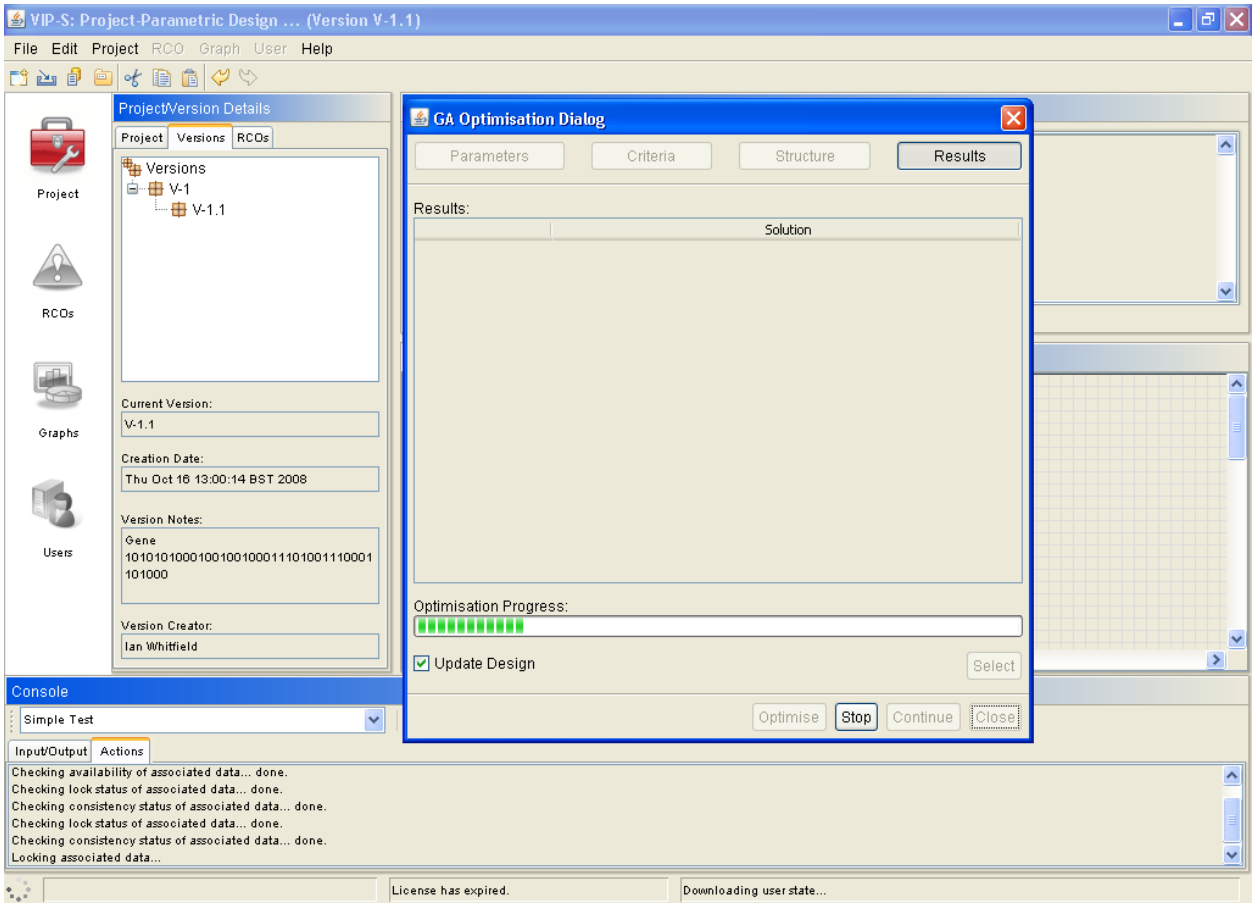


Figure 12-13 Optimisation progress

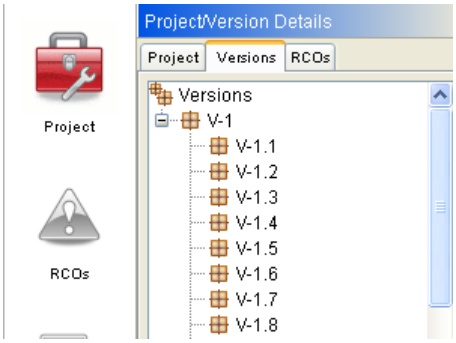


Figure 12-14 Version creation for each concept generated

⚠ *Figure 12-15 displays the changes in the status of the project network during the optimisation progress.*

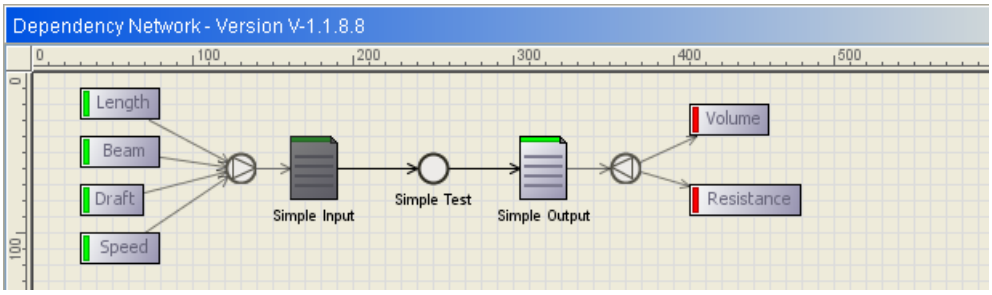


Figure 12-15 Workflow during optimisation

4. The near optimal solution after generation, calculation and production of new concepts will be displayed in the **Results** panel of the **GA Optimisation Dialog** as shown in Figure 12-16.

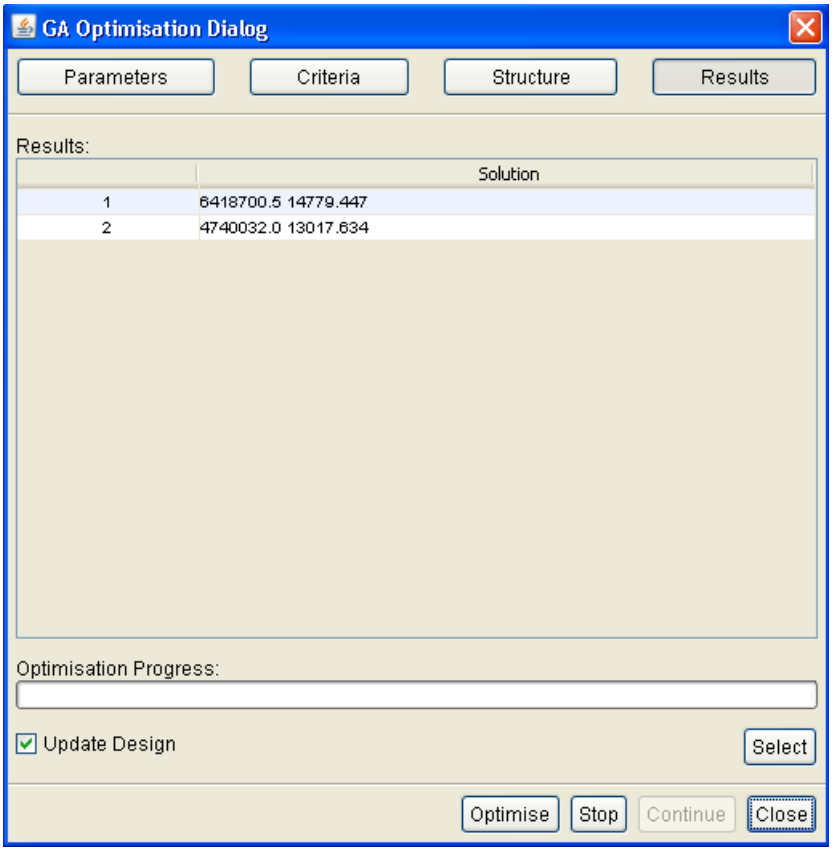


Figure 12-16 Display of results after optimisation

13Using external optimiser

For a given design problem, an approach for integrating an optimisation environment into VIP is being considered. With such an optimiser integrated with the platform, it is possible to manage the parametric information, associate the optimiser with the design data and optimise the design problem with the aim of generating a near-optimal solution.

13.1Approach for optimisation tool integration

To provide context for an approach for integrating the optimisation tool within VIP, first the specific RBD activities of different types of elements within VIP are listed and then followed by the optimisation process in general.

The concept for the integration approach is illustrated in **Figure 13-1**, which consists of the following elements:

- **VIP** provides data and tool level support with respect to projects and versions during the RBD process.
- **Optimiser** allows a workflow to be constructed that identifies the parametric information that will be used within the optimisation problem.
- **API** forms the bridge between VIP and optimisation tool. It allows the optimisation tool to control VIP and access the database storing parametric data records created by VIP.

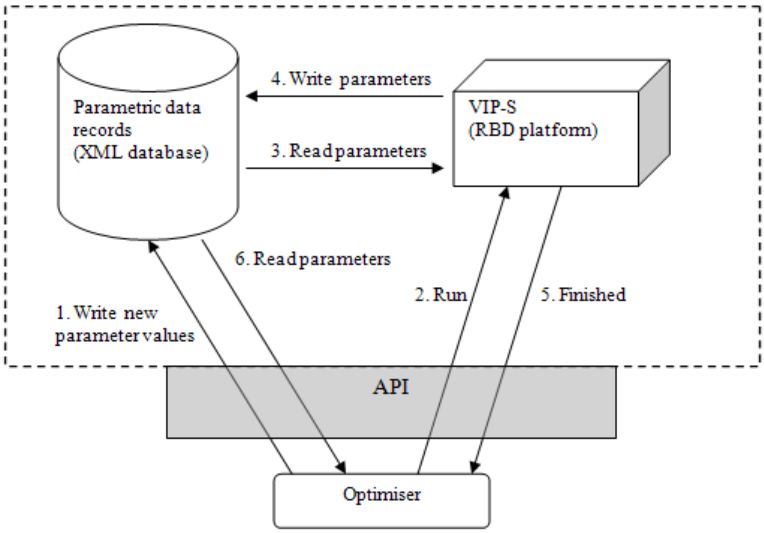


Figure 13-1 An illustration of the integration approach

For a given design problem in RBD, the project with the version that the designer wants to operate will be downloaded and populated within VIP. All design activity is undertaken with respect to the chosen version within the chosen project, and the data is managed accordingly. Only those tools that a designer has integrated are available to that designer for RBD. When the workflow is run within the optimiser, the following actions are envisaged as illustrated in Figure 13-1:

1. The optimiser generates design variables that are subsequently written into the configuration files of the API.
2. The optimiser runs script commands to start the API which loads the configuration files that have been modified by the optimiser. The API then communicates with the VIP and transfers the design variables, which are subsequently stored within the VIP. Once the variables are transferred, the API instructs the VIP to enact the network in automatic mode.
3. The design variables are then transferred into the input files of the tools integrated within the VIP and the tools are run in sequence.
4. The output parameters are extracted by the VIP from the files generated by the integrated tools and stored within the VIP as well as transferred back to the optimiser via the API.
5. The API writes the parameters into its configuration file and exits.
6. The configuration file is then parsed by the optimiser and the results of the evaluation extracted. This process iterates until optimisation is complete, which could be driven and controlled by the user through the optimiser.

In essence, the same approach that is used to integrate any design or PERC tools will be used for the optimisation tool integration. However with one distinction: the implementation of an API that allows the optimisation tool to control VIP and generate and evaluate tools. That is, when the workflow is run within the optimiser, the API communicates with VIP, which validates the communication to make sure it is authentic, and then starts the tool that the API is requesting to be run. Once the tool execution is complete, VIP will communicate the results back to the API (and hence to the optimiser) to say that the tool execution is completed, and the next step within the workflow may be operated.

Figure 13-2 shows the project view within VIP configured with a simple network for illustrating the optimisation integration. When a designer works with VIP, it is firstly necessary to choose the project that they are operating on. All subsequent design and analysis work is undertaken with respect to this project. This allows a distinction between different types of RBD activity on different vessels to be managed within different projects. In addition to project management, the

VIP provides support for managing multiple versions of the design within a project. The user consequently has to choose the version within a project that they want to operate on. All design activity and tool use is therefore undertaken with respect to the chosen version within the chosen project, and the data is managed accordingly. New versions can be created either partially or fully re-using data from past versions.

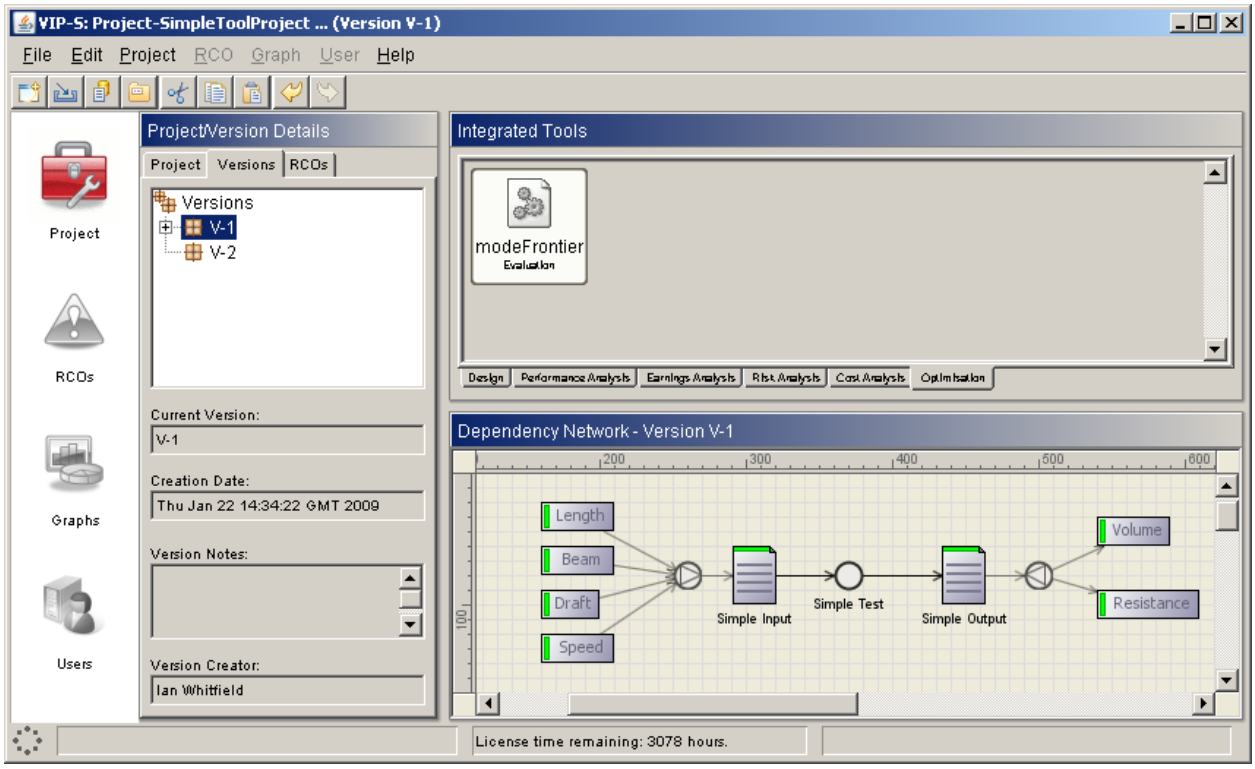


Figure 13-2 Project view

Only those tools that a user has integrated are available to that user for RBD (see Integrated Tools panel in Figure 13-2). Other users may have different tools integrated that are available only for their personal use. The tools are managed and used by the platform in a way that is local to the user. The tools may be configured within VIP such that they may operate with manual interaction, or automatically in the case where the tool performs some automated analysis for example.

13.2 Optimisation process

To illustrate optimisation process, this user manual uses modeFRONTIER as an example of optimiser. The VIP has been designed for general optimisation. Hence users can also choose other optimiser for optimisation.

To start the optimisation, the VIP provides a wizard that guides user through the optimisation process. The following figures show how the optimisation could be done within the VIP.

1. By double click the optimiser in the **Optimisation** tool tab, the optimisation wizard is displayed. The first step (see Figure 13-3) involves selecting parameters of the current project network that will be optimised.

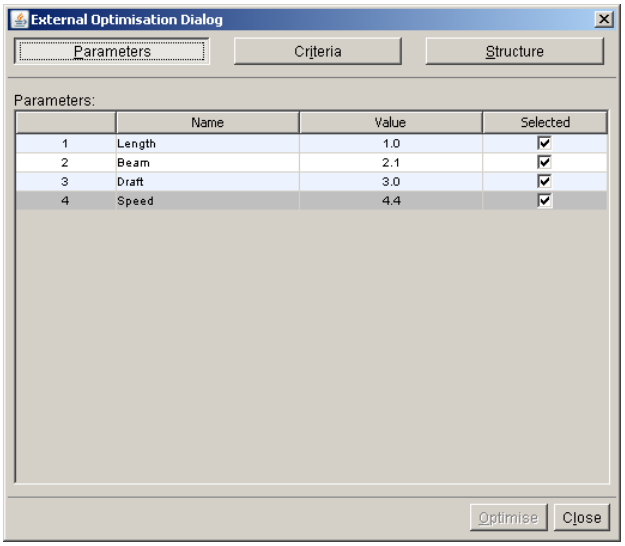


Figure 13-3 Optimisation – Selecting parameters

2. After selecting parameters, the user can choose the optimisation criteria by clicking the **Criteria** button in the wizard window. Figure 13-4 shows this window.

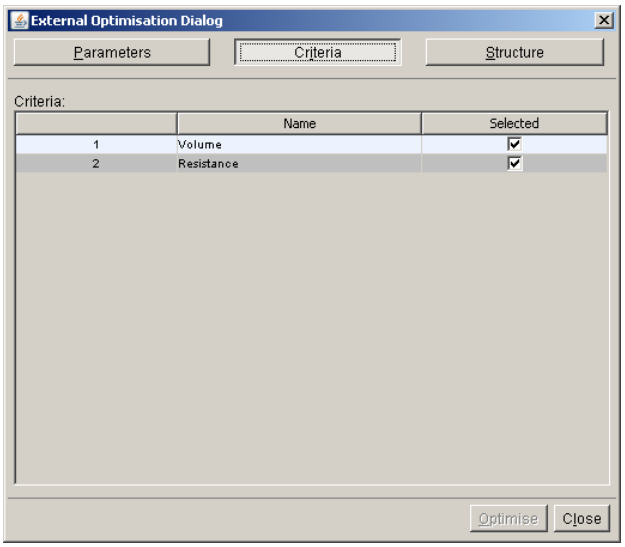


Figure 13-4 Optimisation – Selecting Criteria

3. The last step for starting the optimisation is to configure the structure of the optimisation, which include the optimisation working directory, whether the user wants to create new version for each concept, and whether to lock version during optimisation, as shown in Figure 13-5.

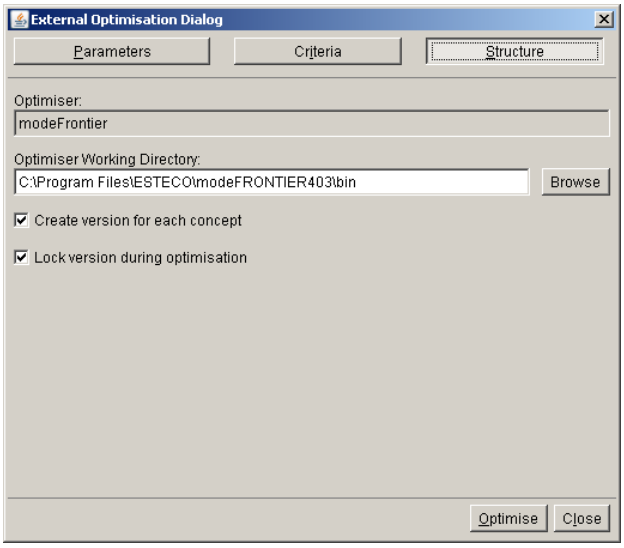


Figure 13-5 Optimisation – Setting structure

4. After finishing the configuration, the VIP will start the optimiser by clicking **Optimise** button. In this example, modeFrontier was integrated for optimisation.

5. A network that can optimise the four parameters based on the criteria need to be available in the optimiser as shown in Figure 13-6.

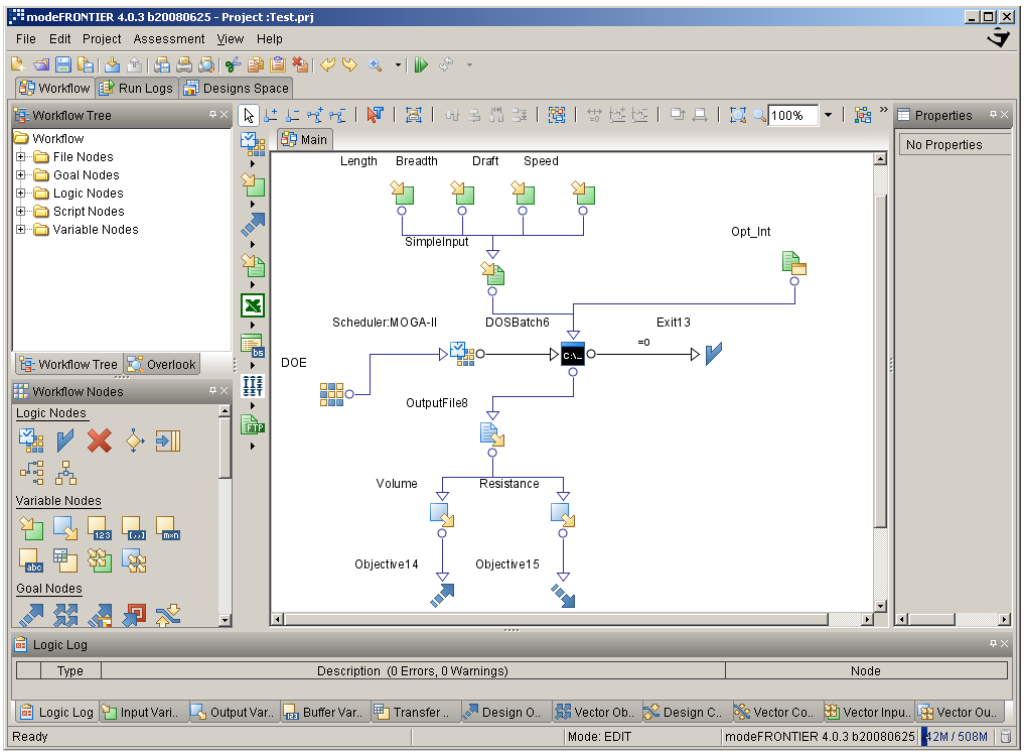


Figure 13-6 Optimisation – modeFRONTIER network

6. By starting the optimisation process, the loop shown in Figure 13-1 repeats for each concept generation. Figure 13-7 shows the design space generated within the modeFRONTIER.

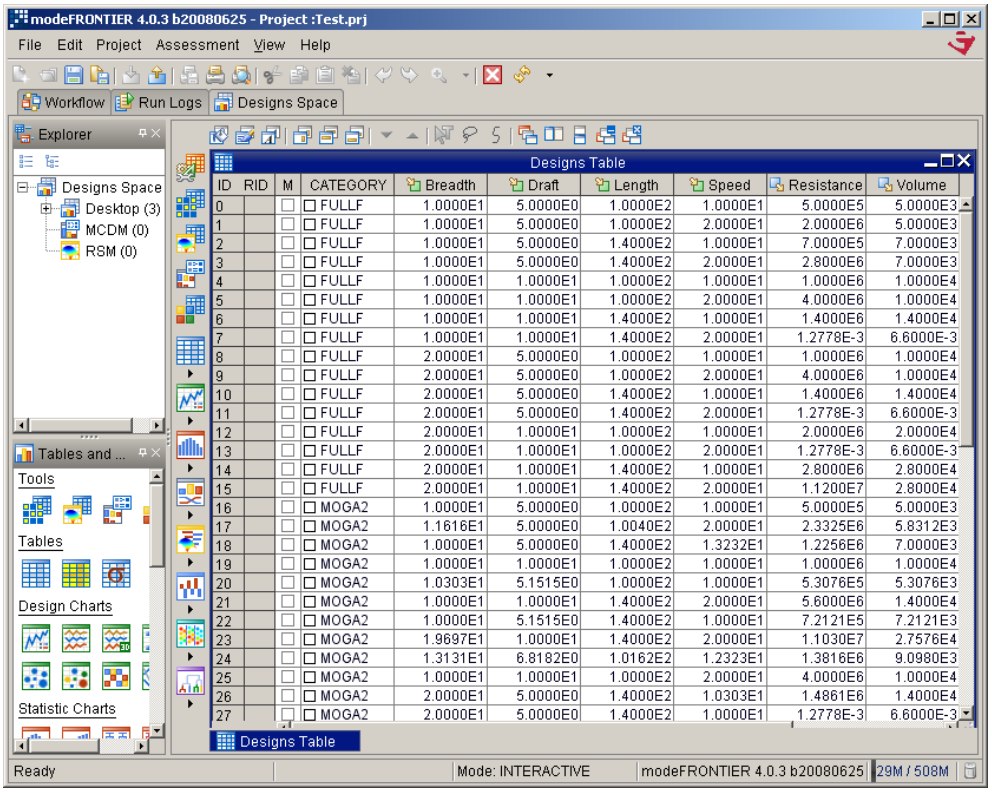


Figure 13-7 Optimisation – modeFRONTIER design space

As a result of the optimisation, each optimisation concept is created within the VIP as a version, and the user can select each version to view (See Figure 13-8).

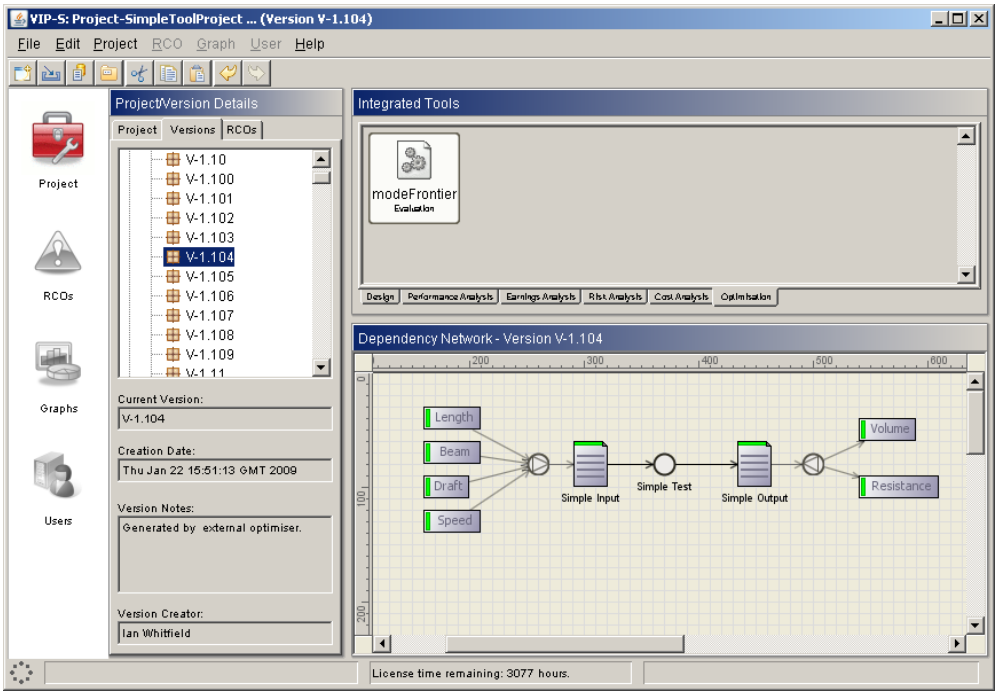


Figure 13-8 Project view within VIP after optimisation

The versions created through the optimisation can also be compared through the graph view in the VIP. Figure 13-9 shows the XY graph view of the 160 versions resulted from the optimisation.

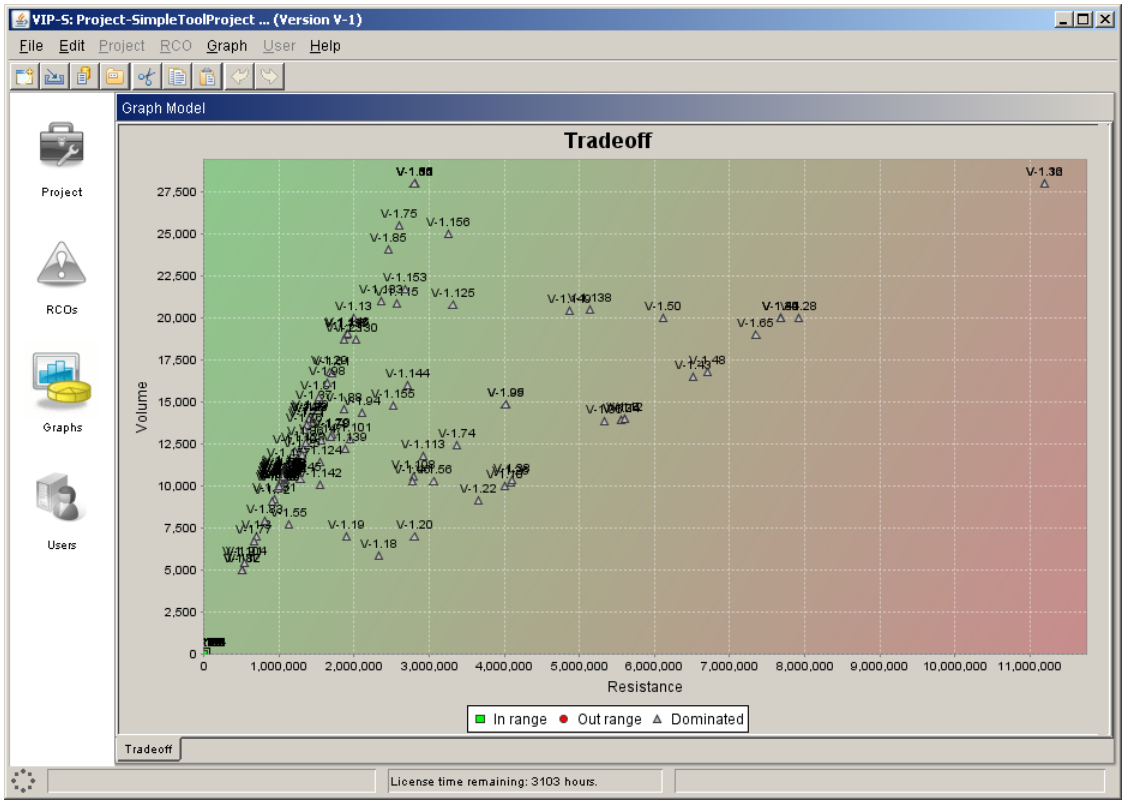


Figure 13-9 Graph view of optimisation versions